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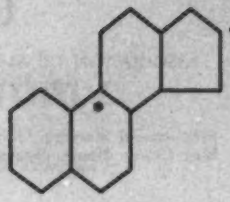

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American College of Surgeons, Regional Meeting, Waldorf-Astoria and Commodore Hotels, New York, Mar. 3-6. Dr. John H. Mulholland, 477 1st Ave., New York 16, Chairman.

Fifth Annual meeting of the Society of Nuclear Medicine, Los Angeles, California, Beverly Hilton Hotel, June 19-21, 1958.

International Congress of Internal Medicine—April 24-26, 1958; Sheraton Hotel, Philadelphia.

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*The American Foundation: Medical Research: A Midcentury Survey, Boston, Little, Brown and Company, 1955, vol. 1, p. XXXI.

**Ibid., p. 900.

An Approach to Evaluation of Medical Education at Western Reserve University*

J. H. Dingle, M.D., T. G. Bidder, M.D., G. F. Badger, M.D.,
D. D. Bond, M.D., T. H. Ham, M.D.,
N. L. Hoerr, M.D. and J. W. Patterson, M.D.†

In 1946, the General Faculty of the School of Medicine at Western Reserve began the planning of a program of medical education which was initiated in 1952 and is now in its 5th year [2-4, 8-11]. The change was instituted in part owing to dissatisfaction with the existing programs and a conviction that the educational program could be improved in many ways.

As concepts regarding medical education were developed, the question repeatedly arose: Is it possible to determine whether any new program will be as good as the old program, or better or worse? Further, can a program be evaluated in such a way as to provide meaningful results? Because of the continuing need for critical study of the program of medical education, a Subcommittee on Evaluation was organized in 1953 and has attempted to develop a broad concept for research in medical education and to carry out a few of the proposals. The purpose of this paper is to outline the approach to the problem of evaluation and to indicate the fields in which studies are being done.

The process of evaluation was considered to have three sequential steps: definition of objectives, collection of data, and appraisal of the data in terms of the objectives. In 1951, the faculty prepared a statement of the objectives of the educational program, recognizing that the total plan and its curriculum were only means of trying to achieve these objectives. Both broad and specific objectives were included. An example of a broad objective was the fundamental object of medical education: to make good doctors. More specific objectives included those of describing the knowledge or attitudes considered necessary for the physician. There were other objectives, such as those aimed at helping the student take responsibility for his own education and treating him as a maturing individual.

Although general goals could be agreed upon, great limitations were experienced by the faculty in clearly defining specific goals or objectives, such as the knowledge or attitudes necessary for the physician. How-

*The program of evaluation has been supported in part by a grant from the Commonwealth Fund.

†Dr. Dingle was chairman and Drs. T. G. Bidder, G. F. Badger, D. D. Bond, T. H. Ham, H. L. Hoerr and J. W. Patterson, members of the Subcommittee on Evaluation, School of Medicine, Western Reserve University. Dr. M. J. Horowitz, assistant professor of psychology and Dr. J. L. Brogal research associate in psychology, have collaborated in the preparation of this report.

ever, it was apparent that faculty members were making judgments concerning the effectiveness of the program based on their individual objectives. For the program of evaluation, it is still considered essential to continue to develop these objectives as definitely as possible.

Collection of data on the educational program was considered to have two general aspects. First, the recording of an observational or descriptive type of data is in the traditional approach of the biologist. Such information is primarily intramural in origin and consists of records of various activities, to include the role of the faculty; the subject content; the opinion of the faculty, students, and observers; and the performance of students and faculty.

The second aspect of collection of data is the use of methods of measurement which can be both intramural and extramural. For example, the student may be tested for knowledge, skills, and attitudes by techniques devised within the school or outside the school. Testing may consist of a variety of techniques, including examinations, attitude and opinion questionnaires, rating scales, and other acceptable modes of measurement. It would be expected that certain aspects of student performance would present difficulties for measurement. These would include such items as the following: the student's capacity for self-education, his ability to use the scientific method, and his ability to make maximal use of the learning opportunities provided by a revised program. It is recognized that evaluation requires comparison, both to standards set by the school itself and to the standards of contemporary medical education.

The scope of evaluation could be broad, including studies of the student before entry into the school of medicine, during medical school, and after graduation; the faculty; educational methods; facilities; curriculum content; and cost. Although it was thought desirable to evaluate as many aspects of a program of medical education as possible and under controlled conditions, this was recognized to present an overwhelming task, especially because of the lack of adequate methods of measurement. Accordingly, evaluation of the program of education was limited to two aspects; first, experience with the program itself which is reported [8-11, 2-4] elsewhere; and, second, study of the student[6] which is outlined here[5].

Research in evaluation of the student was initiated in 1953 under the following broad plan.[1]

Ideally, it would be highly desirable to follow the student's development by obtaining data concerning him when he comes to medical school, by observing and describing how he develops and what happens to him later in his medical career. To do this in a systematic and thorough manner would require that the following subjects be considered:

1. An assessment of aptitudes, qualifications, accomplishments, performance and abilities at the time of admission to medical school.

2. Observation and description of the student's development in medical school.
   a) Factual knowledge—as judged by examinations or discussions.
   b) Professional skills—as judged by observing performance in the laboratory and clinic.
   c) Character and attitudes—as judged by his actions.
   d) Habits of self-education.

3. A careful appraisal, by competent observers, of various components of the educational environment and curriculum, including the faculty and teaching methods.

4. An appraisal of the student following graduation: his performance, skills, choice of a career, contributions.

The Subcommittee recognized the importance of studying all of these subjects, but realizes that practical limi-

---

[1] Report #1 of the Subcommittee on Evaluation, May 23, 1953, to the Committee on Medical Education.

tations will probably make this difficult. At the present time, therefore, the Subcommittee is prepared to make recommendations for only two studies, namely, the evaluation of the student's acquisition of factual knowledge and a study of the development of the student's attitudes.

The first report in these studies of the student is given by Horowitz, Brozgal, and Eaton[5]. They describe some reactions of students in preceptoral groups in the 1st-year clinical science program. The relation of their data to the whole study is shown in Table 1, which indicates the variety of data available from the school of medicine and from special studies.

The panel questionnaire noted under Special Studies, Table 1, has been conducted by the Bureau of Applied Social Research of Columbia University, and reported by Merton, Bloom and Rogoff[6]. This approach has permitted the study of students' attitudes and response to the whole program. Brozgal[1] has studied the clinical performance of students in the basic clerkship by a rating scale and has correlated these results with many of the items in the table. Long-term

TABLE 1

Kinds of Data Available for Study of Medical Students in One Class

	No. students	Year in school			
Usual sources:		1	2	3	4
Data on admission	All				
Comprehensive examinations		x	x	x	
National Board examinations				Part I	Part II
Biological sciences		x	x	x	
Clinical preceptors		x	x	x	x
Family Clinic		x	x	x	x
Basic clerkship				x	
Group Clinic					x
Obstetrics and gynecology					x
Clinical electives					x
Other electives					x
Projects		x	x		
Thesis					x
Bioclinical study sections				x	
Hospital appointment					x
Extra-curricular activities		x	x	x	x
Special studies:					
Panel questionnaire*	All	x	x	x	x
Peer ratings		x			x
Clinical performance ratings				x	x
Description of clinical performance by faculty					x
Observation of preceptor groups	40	x			
Observation in biologic and clinical science	20		x		
Interview of students			x	x	x
Interview of member of family					x

*Bureau of Applied Social Research, Columbia University, N. Y.

studies of twenty selected students are being conducted by Horowitz, Adams,[2] and Brozgal to evaluate the performance of these students in relation to other characteristics. Much of the data has been collected, but a long period will be needed for analysis and reporting. It is anticipated that important indices of performance will be evolved. Also, it is planned to follow these students into their postgraduate and professional careers to evaluate their activities in relation to observations made in the school of medicine.

It has not been possible in the program of medical education at Western Reserve University to set up an adequate control within the school itself. Therefore, comparisons with other schools offer only an approximation to a controlled observation. Through the Bureau of Applied Social Research of Columbia University, the panel questionnaire[7] has been conducted in the schools of medicine of Western Reserve University, Cornell, and Pennsylvania[6]. Accordingly, comparisons are possible of attitudes, responses to the educational process, and certain other data from three widely differing schools. Also the results from the National Board Examinations have permitted comparisons of the performance of students in several schools with that of students at Western Reserve University. It is anticipated that long-term study of individual students in relation to their performance in clinical subjects and with patients may serve also as a basis for further research in the development of the student, in the effectiveness of the individual student, and in the educational methods themselves.

[2]Dr. W. R. Adams, Assistant Professor of Psychiatry, is assisting in the conduct of interviews.

The experience thus far has emphasized the need for evaluation as well as the difficulties inherent in the process. Research in medical education appears to be as greatly needed here as it is in other fields of endeavor. For that reason, consideration is being given to the establishment at the school of medicine of an adequately staffed division of educational research whose primary concerns might be as follows:

1. Evaluation of the effectiveness of the program in relation to objectives and in relation to standards of contemporary medical education.
2. Research in student development.
3. Research in teaching methods.
4. Research in testing methods.
5. Training of investigators in educational research.

A division of educational research could investigate topics which have not been studied in detail in a school of medicine. These could include the student-patient relationship; the role of the teacher; the learning process; teaching methods; and methods of assessing student development. Research in education of medical students could become a subject for investigation by members of the faculty.

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Métodos de evaluación de un curriculum médico

En 1952, se inició en la Escuela de Medicina de *Western Reserve University* un nuevo programa de educación médica, el cual está funcionando desde hace cinco años. Mientras iba desarrollándose ese nuevo *curriculum*, surgió repetidas veces la pregunta de cómo determinar si las innovaciones significaban en verdad una mejora o no, y si sería posible, en general, encontrar métodos de evaluación que dieran resultados definitivos y seguros. El propósito del presente trabajo es indicar cuáles serían esos métodos, tomando como base un análisis de las investigaciones emprendidas por el profesorado de la Escuela mencionada. El proceso de evaluación tuvo tres fases: 1) definición de los objetivos, generales y específicos; 2) acumulación de datos significativos sobre los resultados de las innovaciones, y, 3) apreciación de éstos, en relacion con los objetivos propuestos. Los resultados del estudio contribuyeron a destacar de nuevo el hecho de que la investigacion científica, en el campo de la Educación Médica, es tan necesaria como lo es en otros campos, por lo cual se sugiere que sería de gran utilidad crear en las Escuelas de Medicina un centro permanente equipado adecuadamente para llevar a cabo toda clase de investigaciones relacionadas con la enseñanza médica. El autor indica que serían de interés especial los estudios siguientes: Evaluación de la eficacia de un nuevo programa en relación con sus objetivos y con los *standards* generales de la Educación Médica; problemas del desarrollo estudiantil; investigación de los métodos de enseñanza; investigación de la eficacia de los métodos de comprobación, así como de varios otros aspectos de la Educación Médica que, por lo general, no suelen ser estudiados detenidamente en una Escuela de Medicina, tales como los problemas de las relaciones entre estudiante y paciente, o el papel del instructor dentro del proceso de aprender.

* * *

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Observations of First-Year Students in Preceptoral Groups*

MILTON J. HOROWITZ, M.D.,† JOSEPH L. BROZGAL, M.D.†† and JOSEPH W. EATON, M.D.§

THIS PAPER PRESENTS some observations of the reactions of freshman medical students in preceptoral groups in a clinical science program and, in a more limited way, describes the behavior of their preceptors. As noted in Table 1 of the previous article[6] this study was the first of several studies on a selected number of students in the revised program of medical education at Western Reserve University.

These observations were made when the program was in its 2nd and 3rd years of operation; it is now in its 5th year. Each year, changes have occurred in the program, and, as a result, some of the phenomena observed then may not be evident now. We believe, however, that most of the patterns in student reactions described here are also likely to be found now.

THE CLINICAL SCIENCE PROGRAM IN THE FIRST YEAR

The program in the 1st year deals with the normal man and presents fundamental principles concerning the biological and psychological nature of man in terms of structure, function, growth, behavior, and the effects of the environment upon him. There are four main areas of activity: basic science; clinical science; projects; and free time.

A description of the clinical science program in the 1st year by Harper[3] provides perspective for the observations presented in this paper[1]. He describes the essential features of the program at about the time this study was done:

> The clinical science section meets 3 hours per week and is designed as an introduction to the study of man as an individual and as a member of the family in society. It was felt that during the 1st year the student should learn some of the basic concepts of human personality.
>
> . . . each first-year student is assigned a patient during the seventh month of her pregnancy. He interviews her in the Family Clinic, which was especially set up for him, then visits her in the home and follows her through the delivery. After this, he sees her each month in her home. The emotional and physical growth of the infant is observed at regular visits in the Family Clinic, under the guidance of a pediatrician. The student makes a written note of the physical and emotional development of the infant and this becomes an integral part of the patient's record in the Family Clinic. By doing this, the student can readily see what the advent of a new infant means to a family.
>
> Here, then, is the beginning of the patient-physician relationship for the student. It stimulates his interest in the study of the basic sciences by seeing the integral part they play in the care of the patient. His enthusiasm for learning about people is maintained. This ex-

*The investigation reported here was supported in part by a grant from the Commonwealth Fund.

†Assistant Professor of Psychology in the Division of Psychiatry, Western Reserve University.

‡Research Associate, Subcommittee on Evaluation, School of Medicine, Western Reserve University.

§Formerly Visiting Professor of Sociology, School of Applied Social Sciences, Western Reserve University; now with the School of Social Welfare, University of California at Los Angeles.

[1]Dr. Harper has been chairman of the clinical science program in Phase 1 for the past 5 years. We are grateful to him and the preceptors for their cooperation.

perience helps the student to realize that in modern medicine the physician must work in cooperation with his colleagues from the various medical and ancillary disciplines.

This introduction of the student to the patient occurs at the end of the first month of the school year following the period of orientation. . . Although the medical student may help with making appointments, clarifying to the patient the instructions of the doctor in the clinic, he in no way assumes responsibility for medical care. The patient clearly understands this, but the student comes to appreciate what his personal relationship means to his patient. He is told at the beginning that he is a member of a team who is giving care to his patient.

These expectant mothers[2] are carefully selected by the social worker. They are free from organic and gross social pathology and show no obvious psychopathology. . . Suggestions are given concerning the first interview, and, above all, the student is encouraged to get really acquainted with this individual who is facing a very important health problem.

Immediately after the initial interview, the obstetrical resident conducts the routine examination of the patient, with the student standing by his side.

Classroom material consists of lectures, movies, presentation of patients, and panel discussions. It is arranged to guide the student and increase his understanding of what he is observing and studying. The first month is devoted to orientation. Interviewing techniques as methods for obtaining data are discussed together with some of the fundamental aspects of the patient-physician relationship.

As the students begin to meet their patients, a member of the obstetrical department discusses the biology of conception and emphasizes the importance of understanding the expectant mother's emotional reactions as well as the physiochemical changes which are taking place. The biological dependency of the infant and what this means to the psychological development of man is considered next. The manner in which the needs of the infant relate it to the environment naturally leads to a discussion of the importance of the mother-child relationship and the significance of the emotional reaction of the mother to the pregnancy and to her role as a mother. Attention is then directed to the role of the father, other siblings, and the child's keen sensitivity to the changing moods of the parents, the occurrence of illnesses, death, and separation in the family.

After the Christmas holidays, the student is introduced to the physical examination as a method of obtaining data. He learns that this is a procedure which must be performed with the utmost care and with the full realization that the patient may react to it in such a way as to distort the true picture. The physical examination is taught in a correlated manner with the basic science presentation of the nervous, respiratory, cardiovascular, and digestive systems.

After the student has had an opportunity to follow his infant, a lecture is given concerning the instinctual forces which are the source from which personality derives its energy for growth and function. The mother is the object in the infant's environment which has to do with the gratification or the frustration of the infant's instinctual needs. Lectures and case presentations are centered around feeding and toilet training. It is emphasized that problems arise in normal growth and development, and the way they are met by the parent has much to do with the future emotional growth of the individual.

This material is presented not as psychiatry, or pediatrics, or obstetrics, but as an integrated approach to the study of man, his normal structure, function, and growth.

It is quite understandable that the student should enter into this new patient relationship with misgivings. In the past the faculty has been quite unmindful of the mounting anxiety of the student, except as some maladjusted instructor has referred to it with icy derision. Instead of the wish to be a doctor being utilized in the educational process, the student has been permitted to welter around in his own bewilderment and to build defenses which have often dulled his sensitivity and, thereby, tarnished the very quality which is the *sine qua non* of a fine physician. He has often been forced to conceal his anxiety behind history outlines and stethoscopes, and as a result, never learned how to deal with his own feelings of inadequacy and insecurity.

To help the student with the study of the patient, as well as to appreciate the wealth of feelings which he himself brings to this relationship, a preceptoral system was developed. One preceptor, serving as a colleague, advisor, and friend, is assigned to a group of 8 students with whom he continues throughout the year. They meet for a 1-hour conference after the classroom

[2] Most of the families followed are Negro.

exercise Tuesday morning and for an additional hour Saturday morning. After each student meets his patient, he reports to his colleagues in his group and tells what he has learned about her and how he has felt while going about it. He may discuss any questions he desires; no subject is barred.

Much of the success of the clinical science program rests upon this relationship with the preceptors. They are selected from the departments of medicine, surgery, obstetrics, pediatrics, psychiatry, and pharmacology. In faculty rank they range from full professors to instructors. They are chosen in this manner so that the student may see that the faculty is really interested in correlation, regardless of age or medical discipline. Among other things, the preceptor gives the student a feeling of being accepted as a colleague, and with this goes the feeling of approval for what he is doing.

At the end of the year, the student writes up the history of the patient and her family and files it as part of the regular record in the office of the Family Clinic, where he may refer to it next year.

The Study

The study reported here was exploratory in nature, designed to observe and describe the attitudes and reactions of freshman students in preceptoral groups. It was not our intention to *evaluate* the program, students, preceptors, or this method of teaching. On the basis of these observations it was hoped to define more specific areas for evaluation[3].

Preceptoral groups were selected for study on the basis of observation of these groups in the previous class (class of 1956). It was found that students discussed their reactions toward experiences with the patient and the program in a lively and free-flowing manner.

Five preceptoral groups were observed in 1953-1954. This included study of the behavior of 40 students, one-half the class of 1957, their five preceptors (a pediatrician, psychiatrist, surgeon, and two internists) and the bi-weekly participation of a social worker in each group. In 1954-1955, the observational study was repeated on a smaller scale. Two groups (totaling sixteen students in the class of 1958) and two preceptors (both internists) were observed. The study was repeated in order to determine which of the reactions described in the first study would recur.

A nonmedical observer attended each meeting and unobtrusively recorded what transpired[4]. Approximately 45 meetings were covered each year, extending over a 7-8 month period. A detailed structure for observation was developed with experience; in the second study, a definitive categorical scheme was used from the beginning. Data were summarized and codified at 6-week intervals concerning: *(a)* content of students' communications—covering questions, problems, contributions; major topics of interest; *(b)* content of preceptors' communications; *(c)* characteristic behavior of each student; *(d)* characteristic behavior of preceptor; *(e)* aspects of the group and group process; *(f)* thumbnail sketches of each session.

In the first study the observers met regularly to discuss the process of observation. In addition, two conferences were held, at mid-year and at the end of the year. These were attended by consultants from the School of Medicine and the School of Applied Social Sciences, Western

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[3]We are grateful to the members of the Subcommittee in Evaluation for their support and counsel: Dr. J. H. Dingle, Chairman, and Drs. T. G. Bidder, G. F. Badger, D. D. Bond, T. H. Ham, M. L. Hoerr and J. W. Patterson. It should be noted that the opinions offered in our paper are our own and may not necessarily reflect the views of the Subcommittee on Evaluation or the views of the faculty of the school of medicine.

[4]In the first study, four social group workers and one psychologist served as observers. We are grateful to C. Impallaria Albee, Mary L. Somers, Dorothea Spellman, Joseph Marchese, and Lee Coleman for their assistance. In the second study, social group workers Art Blum and Henry Tanaka were observers. One of the authors (M. J. R.) was an observer, part-time, in the first study.

Reserve University.[5] During the second study, the observers met regularly with the project director (M.J.H.) to discuss their material.

One of the authors (M.J.H.) reviewed all the material and wrote a report for the first study. The second author (J.L.B.) analyzed the data in the second study and wrote a comparative analysis of both reports. These were reports, essentially, of students' reactions and attitudes. Because of the interest in reviewing the data from the standpoint of preceptors' communications, the assistance of the third author (J.W.E.) was obtained. He read the observers' records for each group in the 1st-year study and analyzed the material in relation to: preceptors' teaching methods, the human relations aspects of medicine, social science content, and reflections of educational policy questions.[6]

Results

Results consist of descriptions of trends in student reactions and the behavior of preceptors.

Student Reactions

Getting oriented—The first few sessions are concerned with getting acquainted: with the preceptor, with the over-all program, and, in particular, the clinical science program and preceptoral group. Students quickly attempt to find out what is required of them by the faculty. Their questions reveal great interest in the orientation of the curriculum They ask about the use of free time, the examination system, recommended methods of study, ways of meeting one's responsibilities, and the program's unique features. In relation to the clinical science program, questions concern the selection and assignment of patients, meeting the patient, the first interview, responsibility to the patient, and what the faculty means by the "doctor-patient relationship." The topic of the doctor-patient relationship is in the foreground through much of the year.

Emphases in the program.—After the initial orientation period, several major topics receive a great deal of attention from students in all groups. These include the lecture material presented in the didactic exercises, students' reports of experiences with the patient and questions concerning the student's role and responsibility in the program and toward the patient.[7] These emphases are, of course, related to the lectures and to the structure of the Family Study program. When the first student in each group reports on *his* patient, a new phase in the group's activity is observed.

Beginning the study of the patient.—Those who are first to bring observations on their patient are treated as "experts." Students urge these colleagues to describe their experiences in detail in order to be better prepared for their own assignments. Those who do a good job of reporting are freely complimented by their peers.

As lively as the interest is, there is a noticeable degree of anxiety associated with the first meeting with the patient. This is found in all groups. Most students acknowledge their tension in the first interview. Some, however, minimize or deny

[5]We acknowledge with pleasure the participation and counsel of Prof. Grace Coyle, Director of the Department of Social Group Work, and of Prof. Raymond Fisher of the School of Applied Social Sciences. Many members of the faculty of the School of Medicine also contributed to the conference.

[6]The reports of all three authors were in the nature of working papers and have not been published. This paper represents a condensation of these reports.

[7]The bulk of this paper was written without knowledge of Dr. Caughey's report.[1] It is of interest that his comments regarding how time is spent in preceptoral groups agrees nearly point for point with the emphases presented here.

feelings of being worried; they say that it is like talking to anyone else. When the situation is actually met, say the "experts," it will not be as traumatic as it appears in advance. Generally, it is felt that it is best to go ahead, interview the patient, and then review what has occurred. Students seem to regard the concrete learning experience as preferable to discussion of the issue of "meeting the patient" in the abstract.

Some early problems in the study of the patient.—The first contact with the patient leads students to express certain problems which they were not able to anticipate in advance. The following are examples: this is not a "real" patient-physician relationship; little can be learned from observing normal people; to be a doctor one must be able to do something for the patient; it is necessary to have more knowledge and skill before entering into a relationship with a patient. Feelings of inadequacy are expressed freely. As Caughey reports[1], preceptors try to help students with anxieties and difficulties in the role of doctor-in-training. Harper indicates[2] "It is quite understandable that the student should enter into this new patient relationship with misgivings." One of the apparent virtues of this teaching method is that it allows open expression of uncertainty and insecurity. The role of the preceptor in helping the student deal with his initial anxieties will be described.

Observing the normal patient.—As has been noted, the main emphasis in the 1st year is to give the student an understanding of the normal biology of man. In the clinical science program, patients are selected who show no organic or gross social pathology or obvious psychopathology. Students are engrossed in the study of the pregnant patient and her family. Yet, it is observed that when students report physical, psychological, or social abnormalities, these situations arouse greater interest among their colleagues than when less deviant situations are described. A few students will feel skeptical about learning from the normal patient, especially after the birth of the child. For some, questions by preceptors about "problems" in the family seem to imply that abnormalities are sought after. Gradually they appear to learn that to speak of "problems" is a way of asking for detailed observations or observations that go beyond surface phenomena. Students become able to describe "problems" in their families of which they were unaware in the beginning, and at the same time not feel that to air "problems" means that their families are necessarily abnormal.

Going beyond what the patient reports spontaneously.—Students are observed to broaden and deepen their understanding of patients. Each new body of data is analyzed and related to previous knowledge. However, students feel uncomfortable in the initial or second interview about asking questions regarding the patient's personal life. A question like: "How do you feel about the pregnancy?" is particularly difficult to ask. This may be labeled "prying." Similarly, a few in each group express uneasiness about helping a patient express her worries. One stated it this way: "If I went into it in any more detail, if I pinned her down with her worries, she would have become too threatened." The student recognized the need for additional information and that an understanding of the patient's worries was pertinent to her management; yet he did not feel that he could proceed freely to obtain the informa-

tion. This feeling is not uncommon in the earliest contacts with the patient, but recedes into the background with experience and help in the preceptoral group.

The clarification of role.—Students bring to preceptoral group meetings many examples of problems met in home visits. For example, the husband of a patient may ask for a physical examination; the husband may ask if his 6-year-old son should have a circumcision; the patient herself may ask for advice, in situations of some urgency, for which the student feels entirely unprepared. The student recognizes that it is his responsibility to consult with his preceptor before giving an opinion. In these situations, however, a student may feel awkward about not being able to "do something" more specific for the family.

When situations like these are discussed, students begin to press preceptors for clarification of their role in the program and the limits of their responsibility. They must arrive at a satisfactory relationship with the patient and the family, on the one hand, and a satisfactory relationship with their preceptor, on the other hand, keeping in mind the objectives of the clinical science program. Some may get angry with the program, the preceptor, or the patient for the frustration they feel in being "in the middle" or in not having their roles defined in very clear terms.

The matter of clarifying their role in relation to the patient receives considerable attention in discussions. It is "worked through" in example after example. It is most often couched in terms of responsibility to the patient. One student, for example, voiced his alarm at the amount of responsibility a colleague had taken with his patient. The latter simply reassured the mother that her child would be all right. To the first student, this represented stepping out of line, how could the second student reassure the mother about anything? He reported that he avoided making observations of the infant's physical condition in the home, for fear that this would be interpreted by the mother as a competent physical examination. He did not see it as his responsibility to do anything unless he was absolutely certain that the step taken was the right one.

After many discussions of this kind, and often there are vigorous debates, students develop a working concept of the limits of their responsibility to the patient. Preceptors encourage full discussion of the circumstances in each case and try to help the students see, in each instance, what kind of role would be appropriate and in harmony with the student's position as physician-in-training.

Of particular interest, in these discussions, is the wide range of individual differences in student attitudes. Some are ready to assume perhaps more responsibility than desirable; others are very cautious and tentative. As shall be noted, the preceptor faces a major problem in pedagogy in helping students of diverse views simultaneously.

A laboratory of "life".—Nearly all students are in their early twenties, and more than half are unmarried. A good number, therefore, have relatively little experience in "life." Students are introduced to, and then must learn to relate to, persons with very different social and cultural backgrounds. In many instances, students are surprised to learn of situations such as the following: dependency on social agencies, births out of wedlock, marital infidelity, great ignorance about contraceptive

methods, irresponsibility of one or both marital partners, and unusual living arrangements.

It is understandable that some feel awkward and even embarrassed in asking the patient "personal questions." The point about "prying," mentioned earlier, is probably related to the awkwardness felt in relating to persons of different background. This may become more of a problem when the patient discloses ignorance about contraceptive methods or having a child out of wedlock. Students seem to feel they are getting an education, in a large sense, from knowledge of their patients' lives. The data suggest that the initial embarrassment and awkwardness tend to wear off as the student gets to know the patient and her family well and as he feels that the patient looks to him as her "doctor."

Extending the range of observed phenomena.—Students learn to explore the social, economic, and emotional aspects of the patient's life. They begin to develop a comprehensive picture of what "goes on." Their increased sensitivity to psycho-social phenomena is a part of this broadening process. Students observe and talk about the family's influences on the pregnant woman, the effect of her pregnancy on the family, and the relationship of the environment to the family, the patient, and the pregnancy.

In the course of broadening views about circumstances in the lives of patients, students also begin to consider what may be regarded as the human relations aspects of the patient-physician interaction. They become aware of feelings on the part of patients toward physicians and that doctors are human, too. They bring examples of how patients regard them and dip into personal experiences of how they felt toward physicians. At the beginning of the year, there is some discussion of the problem that these aspects of knowledge are not as amenable to scientific inquiry as problems in the biological sciences. Nevertheless, the topic of human relations in medicine remains of interest as consideration of the physician-patient relationship continues as a central topic throughout the year.

Discussion of this topic also leads students to react freely to observations of physicians in action. It is not uncommon for discussions to include criticisms of the methods used by doctors in handling patients. They may be critical of the practice of having clinic patients wait for long periods of time, or that physicians display a "cool" attitude toward the patient. Others worry about "hurting" patients, and are critical of those physicians who act as if they knew it all. Students seem much more likely to be critical of members of the medical profession than of themselves or of their patients.

Introduction to the physical examination.—A common reaction in all groups occurs at the time the physical examination is introduced, near the middle of the year. Students are gratified that they are now entering into the proper domain of the physician-in-training. Becoming familiar with the equipment needed in conducting a physical examination and with the processes of history-taking and writing a report about their patient are topics of considerable interest. As these topics are introduced, there seems to be a decrease in interest in the study of the patient and in the family study program. Attention becomes fixed on learning new skills.

Fluctuations in interest are noted

earlier, too. After the birth of the child, interests shift from pregnancy to observation of the child. As new techniques are introduced, there is a similar shift but perhaps lesser in degree, from the family to the techniques themselves. However, the student begins to learn of the relationship of the pediatrician to the child as he had observed the relationship of the obstetrician to his pregnant patient. He is in a continuous relationship with the mother and the child in these and subsequent services to the family. Most feel uncertain of their role in relation to the infant, as they had initially in relation to the patient. These feelings tend to be worked out with the assistance of the pediatrician and the preceptor.

Reactions in the latter half of the year.—During the months of February and March, student reactions seem to suggest that a "settling down" process occurs. Attention is given to putting work in perspective. On the one hand, they are meeting new responsibilities (for example, beginning work on projects, preparing progress reports on their patient, and moving along with new subject committees in the basic sciences); on the other hand, they seem to be getting a feeling of how different parts of the program fit together. The reactions of most students show that they have given much thought to the matter of self-education. They have become conscious of the need for assigning priorities to the investment of time.

Discussions center around new topics. Students seem to be more aware of the faculty's attitudes in teaching. They begin to discuss, much more frequently than before, their own attitudes toward the program. These include feelings about projects, the examination system, and the philosophy of the curriculum. Attention continues to be given to the families, but other topics crop up repeatedly enough to suggest that the many components of the curriculum are beginning to have some effects on students' feelings.

A new aspect of responsibility toward the family is then heard. This issues from the requirements that students are expected to write a progress report on the patient. Anxiety about this requirement is allayed as examples are demonstrated of reports submitted by students in the previous class. Incidentally, it should be mentioned that students are helped significantly by comparing their work periodically with the experiences of the previous class. This help extends to many areas. Students often bring up (as does the preceptor—if he had been a preceptor before) examples of experiences of members of the earlier class.

Beginning some time in April, increasing mention is made of feelings of satisfaction with one's achievements. These feelings are related to accomplishments in other parts of the program, as well as the clinical science program. In part, there is a feeling of relief that most of the year is behind them; but there is also some pleasure in looking back at what they actually have learned. There are questions about laying the groundwork for continued contact with the family during the vacation period.

As they look ahead, they also look back. Some take the opportunity to offer criticisms of parts of the program and suggestions for improving them the next year. As they think about their patient, they also think about themselves—for example, preparing for the final comprehensive examination in May. There is some apprehension concerning this examination. Questions about what is ex-

pected of them by the year's end begin about 6 weeks before the end of the year.

Preceptor Behavior

Preceptors function in several roles: as friend, teacher, discussion leader, and counsellor. The role he plays at a given time depends on his own concepts of his role and the participation of students. Typically, students use these meetings to seek information, advice, and opinions; they may ask specific questions or raise general problems. A preceptor must expect questions and discussions that range over the entire curriculum. Question and answer sessions are typical at the beginning of the year. Later, students begin to share responsibility for discussion of an issue, leading to a problem-solving process on a group basis. A preceptor must, therefore, in a sense, know when to allow group participation, when to step in and redirect or focus a discussion. He must be alert to signs of disinterest or rebellion, discomfort or stimulation; he must know when it would be helpful to be active or passive. Optimally, he should have the skills of a group leader as well as having the status of an expert in his field. In addition, he must be sensitive to the differences between his role as educator or therapist or both. This distinction appears important, because preceptors function as persons with whom students may discuss personal problems about any aspect of their education or life.

Preceptors are quite aware of students' needs for reassurance when anxieties about particular learning experiences are shared. They often relate their own conflicts and doubts at a similar stage of training. However, they avoid telling the students what to do in matters of personal concern.

Having to serve as group leader elicits varying reactions in preceptors. Some take to this responsibility by being active, others feel apologetic "for doing all the talking," and some slip into the role of expecting students to carry the major share of discussion. All preceptors showed flexibility in allowing discussions to develop in accordance with student interest on a given topic.

At one time or other, all preceptors are faced with situations in which students debate a subject vigorously or espouse sharply different viewpoints. The preceptor recognizes differences in the inclinations of his students, yet must resolve each situation fairly and wisely, keeping in the foreground the teaching objectives at this stage of the students' education.[8]

In dealing with certain questions, preceptors demonstrate, by example, that physicians must be ready to acknowledge their limitations when necessary. It is not uncommon for a preceptor to say "I don't know" to an inquiry and to refer the student to appropriate sources where authoritative information can be obtained. Preceptors often use such occasions to illustrate that the practice of medicine requires the ability to know when and where to refer a problem; also, that good medicine requires teamwork.

All preceptors stress that there is much more to medicine than can be included in the conventional curriculum. They point to the importance of learning how to interview,

[8] Interest in studying individual patterns of reactions and accommodation to the program led to continuation of our research on a selected number of students through their subsequent education. Observation, interview, faculty evaluations, and life history data were among the techniques used later to develop comprehensive profiles on each of twenty students. Of particular interest are the relationships of student reactions to their first experiences with patients and their subsequent attitudes, later in the program and in their careers.

to conduct a physical examination, to write reports, and to get along with people. They present themselves as perennial students who did not end their study after obtaining their degree. Medical school is described as only 4 years of a lifetime of professional education.

All preceptors encourage students to give proper attention to the scientific method in the evaluation and care of the patient; in reporting and interpreting observations; in conducting themselves as physicians. Students respond favorably to the goals of being scientific and fair in considering the patient, her family, and problems.

However, not all issues discussed are a matter of science; many complex points involving ethics are raised. Preceptors find themselves teaching much about the ethics of medicine. They present students with what might be regarded as "ego ideals" about the qualities of the good physician, attributes of good medical practice, and the public responsibilities of the medical profession. All preceptors encourage students to express themselves on controversial issues, whether these involve a professional matter like misconduct by another physician or a medico-political subject such as socialized medicine. All preceptors advocate that students have a personal interest in every patient and assume responsibility for the patient in accordance with their role as physician-in-training. There is strong support for the creed that all men deserve equal treatment and respect.

Not all preceptors, however, are comfortable in discussing the ethics of medicine or the human relations aspects of medicine. Some prefer to spend more time in teaching specific skills such as the physical examination or history-taking. Similarly, when students present observations on their patients, one preceptor is apt to emphasize the physical findings, while another may spend more time on the student's relationship to the patient. There are noticeable differences among preceptors in areas of interest, in teaching method, and in the ease with which they are able to move within their roles as teacher, friend, counsellor, and group leader. Though preceptors had a general outline of their responsibilities, it was necessary for each, slowly, to find his most effective pattern as group leader and teacher.

In handling students' questions about human relations in medicine, preceptors rarely couched their answers as generalizations derived from research. Ideas about culture or social change instead reflected the preceptor's "common sense" or personal experience. The concept of *culture*, for example, was generally restricted in its application to persons with beliefs and practices that would seem unusual to the majority of medical students and doctors. It was used to explain the behavior and attitudes of persons belonging to minority groups, such as migrants from the South, Negroes, and Japanese-Americans. Rarely was it applied to explain the dynamics of thinking or behavior of medical students, of the medical profession, or of a hospital. Preceptors, in general, tended to give implicit support to the notion that medicine is a social as well as a physical science, by the extent of their concern with topics relevant to social structure, social change, and family relationships.[9]

Discussion

It is generally accepted that the

[9] A more extensive discussion of the teaching of social science topics by preceptors may be found in Eaton's article.[2]

preceptoral group serves as a vital mechanism for the implementation of curriculum objectives in the clinical science program. For the preceptor, this teaching medium offers an unusual opportunity for continuous and close contact with a small group of students in which considerable teaching may be done and through which the progress of individual students may be followed and evaluated. For the student, the preceptoral group allows a close, continuing contact with a member of the faculty and provides a forum in which observations and experiences may be discussed freely, where knowledge may be pursued, skills developed and counsel and clarification of problems obtained. As Harper[2] points out: "Much of the success of the clinical science program rests upon this relationship with preceptors."

One of the greatest values of the preceptoral teaching method appears to lie in helping the student deal with anxieties and other reactions associated with the learning process. Particularly significant, it seems, is that students are helped with their feelings in meeting "first" experiences. These "firsts" include: interviewing the patient, visiting the home, attending the delivery and the visits of the mother and child to the Family Clinic, and writing a progress report on the development of the child. Introducing the student to concepts of patient care, professional responsibility, and the patient-physician relationship are certainly novel experiences for the freshman student.

These "firsts" are obviously only part of a larger development in the student's life, namely, entering into a period of professional training. The change from college student to the role of physician-in-training is an experience of major proportions and results in feelings of insecurity and anxiety. It comes as no surprise, therefore, that the clarification of role in relation to the patient was easily the most vexing problem faced by first-year students in the clinical science program.

To be sure, students also seek explicit definition of what is expected of them in other parts of the program (basic sciences and projects), especially in the initial phases of these experiences. Their initial uncertainties obviously intrude into discussions in preceptoral groups. However, we believe most would agree that adapting to their role vis-a-vis patients is more complex and needs a longer period of time for clarification. Here, such matters as defining the responsibilities of the physician-in-training and gaining familiarity with the skills, values, and attitudes of the professional person are issues which are almost entirely new. Work in basic science and projects seems more clearly associated with experience in college, whereas adapting to responsibilities for work with patients is a new area for development.

Observations permit us to say that students gain a working concept of their role in relation to the patient. As Caughey observed[1]:

> Almost all the first year students learn that: (1) they can say to the patients they do not know the answer to a question without losing status in the patient's eyes, provided they take steps to find the answer and relay it back to the patient. (2) Without providing strictly medical service, they gain the confidence of the patient because of the interest they have in the health problems of the family.

In part, clarification results from the faculty's descriptions of the student-physician's responsibilities. However, students also need the opportunities to "work through" their

feelings in this role; this requires that many examples of student-patient relationships be brought to preceptoral groups for analysis and discussion. As new experiences come to the fore, this "working through" process recurs.

Other gains seem to accompany and follow the understanding of role. There are increasing feelings of confidence and satisfaction concerning the material learned. Responsibilities that at first seemed difficult, if not prohibitive, are met with greater assurance. Relationships with the patient become firm and, in retrospect, are regarded as major achievements. A feeling that something of importance has occurred in the course of the year is often described. Students also show an increasing awareness of what the faculty has been trying to teach. This awareness includes developing and maintaining sensitivity toward the patient and keeping the patient and the student-patient relationship in the foreground throughout the year (despite shifts in interest following the introduction of new material). A few students, however, maintain resistances against entering freely into the role of physician-in-training. They are inclined to feel they need more knowledge and skill before assuming even limited responsibility; they would prefer to use this time to further their knowledge of basic science and resist the intrusion of the study of the patient on other duties.

To these gains must be added a gain of another order. This concerns the development of attitudes toward the learning process itself. For example, students learn they may share anxieties and uncertainties without losing status in the eyes of the preceptor. This feeling parallels Caughey's observation that students can say to patients they do not know the answer to a question without losing status in the patient's eyes. As a matter of fact, the acknowledgment of uncertainty by students seems to be regarded with favor by preceptors.

This is not surprising, of course. One of the major reasons for establishing the preceptoral system, as Harper pointed out, was to give the student an opportunity to express and deal with his anxiety. This is based on the assumption that in doing so the student would not build defenses and dull his sensitivity to the patient. Under previous programs, it was felt, the student was permitted to "welter around in his own bewilderment and to build defenses which have often dulled his sensitivity and thereby tarnished the very quality which is the *sine qua non* of a fine physician." Our data obviously do not permit any conclusions in this regard, but it is possible that as a result of these early experiences students develop different attitudes toward the learning process compared with students trained under previous programs or other current programs in which such opportunities are not provided.

It should be noted that we point to the possible influence of these experiences on attitudes toward the learning process itself. This is to be differentiated from attitudes toward the patient or professional responsibility. There seems to be an underlying assumption in the program, namely, that in order for students to develop favorable attitudes toward patient care and professional responsibility, it is necessary that they first develop favorable attitudes toward the learning process. One of the requirements, here, apparently, is that they share their uncertainties and enter actively into the process of assuming responsibility for their education.

Do students ultimately develop favorable attitudes toward the patient and their responsibilities as a result of these experiences? Are the attitudes shown by students trained under this program significantly different from those shown by students trained in the previous program or elsewhere? Do these experiences ultimately yield long range benefits; do they become "better" physicians? What have been the distinct advantages of exposure to the patient and the first-year clinical science program? These are questions likely to be asked in many quarters and for which no answers are yet available. Certainly, the limitations of our method permit no answers.

These are a few questions, however, among many being studied in the evaluation of the revised curriculum. It is recognized that such problems require long-term study and clear criteria for judgment. In studying the development of attitudes, the faculty is very much aware of the multiplicity of variables operating in the formation of attitudes and the inherent difficulties in determining cause-effect relationships between experiences and later behavior. This is a crucial problem for evaluation, nevertheless; and, it is but one of many topics on which evaluation studies have been and continue to be centered. We recognize that we are encroaching on some of the major problems in evaluation in raising these questions and in offering this quotation from Reader[8]:

> Certainly one must be exceedingly wary of concluding that because a teaching program works out as planned, students exposed to it become better physicians than those trained under some other educational philosophy.

It may be relevant to add that, as a result of the exploratory study described in this paper, additional studies have been done based on some of the observations reported (see footnote [8]). These studies are longitudinal in design and are focused on the development of individual students. It is hoped that by studying individuals in some depth we shall better understand the cumulative effects of the many experiences in medical school on the student's subsequent behavior and attitudes. Obviously, the student's experiences in the preceptoral group and with his first patient are only first steps in his evolution as a physician.

Summary

This report represents some observations of the reactions of freshman students and their preceptors in a clinical science program. Particular attention is given to the initial experiences of students with the patient. Development of students' interest during the year is outlined, and several major problems met by students in their role of student-physician are illustrated. Contributions of the preceptors are described as they help the student adapt to his relationship to the patient and to the whole program in the 1st year. Emphasis is placed on the definition of role in the program and the student's responsibility as a student-physician. Limitations of this study obviously do not allow conclusions regarding possible long-range effects of these early experiences. This study is not intended as an evaluation of the program, of students, or of the preceptoral method of teaching. It has served as a basis for more intensive, longitudinal studies in the development of students.

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Algunas observaciones sobre las reacciones de estudiantes de primer año, y preceptores, en un curso de ciencia clínica

Este trabajo es un informe sobre las reacciones que muestran los estudiantes de primer año, así como sus preceptores médicos, en un curso de ciencia clínica. La investigación fué llevada a cabo por un grupo de profesores de Psicología y Ciencias Sociales, con ayuda del *Commonwealth Fund*. Se describen las diferentes formas en que se desarrolla el interés de los estudiantes en el curso de ese programa (de un año) y se pone énfasis especial en los problemas relacionados con el hecho de que dicho curso significa para los estudiantes su primer contacto directo con enfermos como pacientes. Tambien se pone hincapié en los métodos que aplican los preceptores médicos para ayudarles a establecer una relación adecuada con los pacientes, y se discute la cuestión de la responsabilidad médica estudiantil. Los autores advierten que se trata de una investigación limitada, que no permite conclusiones definitivas en cuanto a los efectos de largo alcance de esas primeras experiencias clínicas de los estudiantes; y tampoco pretende este estudio ser una evaluación del método preceptoral. Mas los datos secados a luz son valiosos como base de una serie de investigaciones de mayor envergadura.

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Separatas del artículo completo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

A Study of Medical Education in the United States*

D. Joe Baughman, M.D.†

The material presented here on medical education in the United States is an attempt to illustrate some of the historical events and socio-economical pressures which have precipitated the various changes in medical education. Also, it is indicated that the methods of medical education did not change entirely because they were inefficient and outmoded. The assumption is made by the author, from a study of three centuries, that the methods of medical education are, presumably, the direct result of three influences, namely: the practice of medicine, the field of general education, and the scientific knowledge that medical practice has used for a foundation. If this assumption be correct, then other influences which appear to affect medical education would act indirectly.

The practice of medicine, because of its unique position as the origin of medical education and as the end result towards which all medical education is directed, seems to have had the largest single influence of the three. Also, because of its position, the practice of medicine itself appears to be subject to many influences. Accordingly, it appears quite evident that wars, laws, wealth, communication, and transportation all have affected the field of medicine. Probably one of the most forceful and yet indeterminate influences has arisen from the people's attitude towards health and disease. Also, the opinions of doctors, conditions of hospitals, and principles of practice have helped to influence changes within the medical field. All these factors, acting on medicine, are reflected, it is believed, by changes in medical education.

General education appears to have been influenced by many of the non-professional factors that have affected the field of medicine. However, general education appears to influence medical education in two different ways. First, as general education has advanced its prestige, practices, and principles, medical education has, apparently, benefited by incorporating many of the advancements of general education. Secondly, as the general population has increased its educational level, there seems to be a greater demand by the public for better things, medical education included.

Scientific knowledge has not always been the foundation of medical practice, and the transition from an empirical basis of medical practice to a scientific one is assumed to have had a major effect in the revision of medical education.

Although these three influences have been described separately, their effect upon medical education has been an interrelated and overlapping

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†National Science Foundation Postdoctoral Fellow in the department of biology at Massachusetts Institute of Technology, Cambridge, Mass.

phenomenon. It is the author's hypothesis that the changes which have resulted by an increase in one of these three influences have been possible only at the expense of the influence of another. With the first assumption in mind, medical education of the past and present will be considered by analysis from the author's hypothesis.

With the first settlements in North America there was no problem of medical education, because all the first physicians were educated in Europe. However, many physicians came to the new country only to obtain medical experience, and most of them later returned to Europe. Of the educated physicians that remained, the majority were clergymen; medicine was an important part of theological training at that time. With the increase in the number of settlers and with the many infectious epidemics, it soon became apparent that the settlements would have to supply their own physicians. According to Packard,[16] the distinction of being the first teacher goes to Dr. Lambert Wilson, churgeon, in April 1639, at Massachusetts Bay.

For the most part, medical education consisted of a local physician's bringing some young man into his office to learn the art of medicine.[1] These physicians, called preceptors, bound their young students by a written contract, so that, once begun, the course could not be dropped. The contracts lasted from 3 to 7 years and usually contained clauses requiring the student to perform certain duties about the office. For these privileges, the students paid a fee of usually $100 annually. If the student lived with the physician, he was frequently required to work about the house as compensation for room and board. The great majority of young men beginning medicine in this fashion had little or no formal education, although a few, apparently, possessed college degrees.

Uniformity of Instruction

The instruction during this period was fairly uniform and could be divided into three periods. The first period consisted of reading the books on the doctor's shelves and memorizing anatomy. If the preceptor were a conscientious instructor, the anatomy would be supplemented by dissection. Human dissection was illegal at this time, and grave robbing was not uncommon among physicians. Obtaining dissection material in this fashion necessitated that the dissection be completed secretly and in a few days. Sometimes the physicians were prominent enough to obtain the body of a criminal whose crime was so bad that hanging was not punishment enough, and his remains were sentenced to dissection. Many dissections were also carried out on other mammals. The second period began with the study of drugs and the mixing of prescriptions. This usually marked the beginning of the student riding with the preceptor and observing the symptoms and treatment of disease. The third period consisted of the student assisting the physician and even caring for some of the patients himself.

At the completion of the terms in the contract, the physician certified by a written document that the young man was ready to begin practice. Sometimes those certificates were signed in the presence of a justice of the peace and other witnesses. There are some records that colonial assemblies licensed a few physicians, but this legislation had no apparent effect on medicine at this time. A

[1] Except for the special references noted, all the material on the preceptorial system was compiled from Waite(23), Packard(16), Park(17), and Haggard(10).

little later, medical societies, which were groups of physicians organized to raise the standards of medical practice, authorized physicians to practice in their localities. This proved to be the best authorization of all. However, the preceptor's signature was proof enough in all cases. There were instances of falsification of signatures, so that some untrained men claimed to have medical education.

Transportation between communities was so poor that it limited the number of patients one physician could treat. Since there were no hospitals, the physician was required to visit the sick at home. Most people had little concern about medical treatment unless they became ill themselves and sought a cure, not a laboratory or a hospital. All these influences, it appears, had the effect on medicine of making it intensely practical. Physicians realized that to treat yellow fever and broken limbs was far better and more useful than being educated in the so-called sciences of the day.

From this situation, an empirical and dogmatic foundation for the practice of medicine was established. Physicians treated symptoms rather than the disease and based their therapy on superstitions, intuition, and methods others had used. This may be understandable when it is realized that the scientific knowledge of the day was extremely limited and could be reviewed in a relatively short period of time. Science had not yet thrown off the traditions of Galen and of Aristotle that had been used uncritically for centuries. Even in Europe where 7 years of school and a thesis were the requirements for becoming a practicing physician, the men learned little more, and the theses consisted for the most part of anatomical descriptions. In England at this time lectures given to prospective physicians dealt for the most part with such abstract topics as religion, ethics, manner, attitude, Mother Nature, and mistakes.[9]

Formal education had not begun in America before medical education was needed. Hardly any able-bodied male could be spared from the plow to go to schools when schools did become available. Education was not as essential as farming. If one learned how to write and read but didn't learn how to farm and to hunt, he might not survive. Education, it appears, is a result of men desiring communication and advancement. Since the early pioneers were much more concerned about survival, they had no time to "waste" on anything so "useless" as education.

Preceptorial System

The fact that medical teaching continued by preceptors for over 200 years represents how well they filled the needs of their period. There are those now who realize that this primitive method possessed something that classrooms and laboratories of today have lost. Waite,[23] however, describes it:

> . . . the result was an individual well trained in the art of medicine with little knowledge of medical science.

The preceptor of that early period furnished the colonies with plenty of doctors without too much time lost in teaching them. For adequate educational methods they would have required much larger amounts of time and money than they possessed. The most essential and practical details of medicine were taught quickly and easily. The settlers believed that these methods were superior to anything that had been developed previously,

> Our young Students in Physik may be trained up better than they

> yet bee, who have onely theoretical knowledge, and are forced to practice before ever they saw an Anatomy made, or duely trained in experiments . . . Packard[16]

and they may have been correct:

> Indeed there was about American medicine a practicality that distinguished it from European medicine, which in these years Molière was satirizing with his barbed pen. . . . Haggard[10]

It is assumed, therefore, that the preceptorial system originated primarily from the practical influence of the practice of medicine of the day. There was little effect from the influences of general education and scientific knowledge, since neither of these had advanced to a position of importance.

The pioneer conditions were not permanent, however, and eventually the preceptorial system was changed. Presumably, the change in the three major influences which lead to the decline of the preceptors was the cause for the rise of the following system.

The pioneer attitude towards education began to change. With the increase in the size of communities and the accumulation of wealth, education became a desirable and necessary asset. With the founding of Harvard in 1638, the forces which were to change the preceptorial system were rising with it. However, as stated in the hypothesis presented earlier, it is not enough to have one influence increase, such as general education, if there is no change in the dominant force, which appears to be medicine itself. The author feels that this relationship is convincingly demonstrated during the 20-year period just prior to the Revolutionary War.

At this time some liberal arts schools introduced medicine as a part of their curriculum, e.g., the University of Philadelphia, Harvard, Dartmouth, Columbia, and King's College. The programs were fashioned after the many schools abroad, and for the most part success was wanting. Requirements for admission, a B. A. degree, were apparently too high. Also, after graduation a degree of Bachelor of Medicine was given and not an M. D. The Revolutionary War interrupted this educational effort. It would have been of interest to have had this attempted revision by general education continue unabated for a longer period of time.

This apparent failure of general education to revise medical education by itself is believed to have demonstrated two ideas. First, Waite[23] makes the observation that the failure of the universities was due to the attempt to use a proved English system of medical education in a country where the English economic conditions did not prevail, i.e., an advanced system of education in a pioneer country. Second, the practitioners of medicine definitely resisted the change that the universities represented. Preceptors objected to losing their students to the schools, and students rebelled at the idea of the preparation for practice being so long. In general, a conflict was started between schools and the preceptors which appears to have produced a system of medical education much worse than the propositions of either.

Medicine, assumed to be the main influence on medical education, had permitted the standards of education to decline. Packard,[16] quoting from William Smith's "History of New York," describes the territory as having many quacks, few respecting physicians, and no laws. Drake[5] described the men entering medicine,

> A neighboring physician wants a student to reside in his office; or

> one of the family is thought too weakly to labour on the farm or in the work shop; he is indolent or averse to bodily exertion; or addicted to study, but too stupid for the Bar, or too immoral for the pulpit; the parents wish to have one gentleman in the family . . .

In some localities groups of men realized the trend toward organized medical societies. These societies, empowered by law to authorize the persons who were to practice, did much to increase the standards of the profession.

There was one outstanding event which culminated all of these forces and changed the character of medical education. This was the Revolutionary War. In the words of Haggard,[10]

> ". . . if patients profited little from the doctors, the doctors profited a good deal from the war. It was the first time that men trained in medicine by apprenticeship in small towns were brought in contact with physicians educated in Europe."

It seems that the European-educated physicians had a certain knowledge that the apprenticed men were lacking. Osler[15] attributes this influence directly to France.

The system of medical education that followed the preceptors, it appears, was characterized by the following influences. Medicine was giving up some of its original methods in order to obtain more scientific knowledge. Education was giving up some of its original requirements to become more practical and acceptable to medicine. Thus, the two appeared to compromise and to evolve the proprietary schools[2].

The first school of this nature was the product of a medical society which had been given the authority to judge a physician competent or incompetent in New York in 1807.[3] There were two other methods by which schools could be chartered legally. One was to obtain a legal attachment to an existing university whose charter already had the provision for a medical school. The other method was by the spontaneous organization of a few doctors who had enough influence to obtain a charter from the legislature. Although arising in different manners, most schools' educational systems were similar.

The requirement for entrance into school was a high school diploma or its equivalent. The equivalent usually consisted of a recommendation given from a preceptor to the treasurer of the school by a student just prior to paying the fee. The fee covered all the lectures for one term. A term lasted anywhere from 3 to 6 months. The whole medical course was designed to last for 3 years, with one term a year for academic material and the rest of the time to be spent with preceptors. If a student spent one whole year with a preceptor prior to matriculation, he was required to attend only two terms before graduation.

The professors or instructors of this period were practicing physicians who would join a faculty or begin a school because of the added prestige that was given to his practice by being a professor. The salary of these professors was the distribution of the net income from fees after the relatively small overhead had been paid. How important this type of remuneration was is hard to ascertain, because during the Civil War when schools were running in

[2] There may seem to be a discontinuity in the chronological order of events with relation to dates. This conflict is unavoidable, and the attempt by minimal usage has been made to lessen this disagreement. The trouble lies in the fact that different localities were ready to rid themselves of preceptors long before others. e.g., Philadelphia was ready in 1750 and Ohio not before 1820. If this be kept in mind, many incongruities may be better understood.

[3] Most of the descriptions on the independent schools to follow were found in Waite[23], Holmes[12], Drake[4], Osler[15], and Flexner[6].

the red, the professors themselves absorbed the losses. The reasons for teaching probably varied for the individual, since some professors journeyed between schools lecturing on their subjects. Many schools conveniently arranged their schedules to coincide with these circuit scholars.

The medical courses of this period were largely didactic. When registering, each student picked out the course of study which suited him the most. Since all courses were given from the lecturn in an assembly room, the only type of buildings that were rented—few were owned—consisted entirely of three or four large lecture halls. The lectures given each year were usually identical to the lectures given the previous year. There were no separate classes for beginning or secondary students; everybody was in the same class at the same time. Laboratories were nonexistent and were deemed unnecessary. In anatomy if a dissection was made, and human dissections were still illegal, a demonstrator performed the dissection in the hall, while the professor lectured behind him. Clinics, if there happened to be any, were conducted in a similar manner of demonstration. No records of progress or attendance were kept, and the only certification that a lecture had been attended was the matriculation cards distributed at the beginning of the term.

When the 3-year period for an individual was about complete, he would apply to the faculty for an examination that would qualify him for graduation. Failures were almost nonexistent. If a student was considered bad enough to fail, he was usually directed elsewhere before his 3 years were completed. Two other requirements for graduation included a thesis and documentary proof that medicine had been studied for at least 36 months. The theses consisted mostly of descriptions of anatomy or some common disease. The students who passed these three requirements were adjudged fit to practice medicine by a Board of Censors.

The Board of Censors was a body of the faculty which the state required by law to examine all prospective physicians to be graduated from their school. Since the state had chartered the school and given to the Board of Censors legal power to judge a graduating physician competent, the state authorized all physicians which passed a school's Board of Censors.

The proprietary schools of the first half of the nineteenth century represented the lowest level to which medical education had sunk. Most people recognize this situation, but they have attributed this decline to different factors.

Osler[15] notes.

> ". . . nothing contributed more to the degeneration of the profession than this competition and rivalry between ill-equipped medical schools."

Flexner[6], more correctly perhaps, observed:

> The rapid expansion of the country, with the inevitable decay of the apprentice system in consequence, must necessarily have lowered the terms of entrance upon study. But for a time only.

It appears inevitable that the rapid growth of the United States in size and number of citizens would necessitate the rapid production of physicians. Although the preceptor system gave the quantity of physicians that was required, it appears that the people of that period did not feel that the quality of the practicing physicians was good enough. And since the French (Osler[15]) had made popular a scientific basis for

medical practice, it was thought a combination of preceptors and institutional instruction would bring the desired affect. The author's explanation for the failure of proprietary schools is based on the given facts and earlier-stated assumption, namely: that the revision in medical education did not contain the necessary revision of emphasis to be effective. Thus, the increased emphasis in education by lectures in medical schools was not accompanied by sufficient decrease in emphasis on the practical aspects of the practice of medicine.

The revision of medical education from proprietary schools to the present university-type graduate school was a long and gradual process. It began with the inauguration of the graded system of classes at Chicago in 1859 (Flexner[7]) and was not ended until soon after the Flexner Report of 1910.

How valuable this long time for transition was is difficult to determine, but there are several reasons why this did happen. It was not realized at first that an educational revision was necessary. Welch[4] reported that the results of this period were better than the system from which they came. People were slow to realize that the situation could be improved; other professional schools, law and theology, were conducting their schools by similar methods (Chew[4]). Another reason was that medical education had been rushed through a rapid change only 50 years earlier and was still recovering from the effect. The next 50 years, approximately from 1860 to 1910, was a period of transition in which the three assumed influences were slowly and thoroughly re-evaluated.

[4] Quoted from Flexner[7].

Medical education was moved from the large auditoriums of the proprietary schools to the classrooms and laboratories of universities. The courses were extended to include 4 years of 36 weeks a year. Requirements for entrance were raised to 3-4 years of college work. The attendance was recorded, and progress by means of tests was noted at all times. Professors became full-time instructors. Profit was removed from medical education, and all schools in order to exist needed large endowments. Hospitals became of primary importance in teaching medicine. Graduation was not considered the end of medical education, and the internships became necessary learning periods. Experiments were individually performed, and teaching was done to small groups. All these changes were acquired slowly, and each was bound to be sound before it was incorporated into the system.

While the whole 50 years from 1860 to 1910 were consumed in making a revision, there was around 1890, it seems, a succession of events which influenced the whole character of the following period. Prior to this, it was earlier noted, the fields of general education and of scientific knowledge had made their influence effective on medical education. However, medicine was still the dominating factor. Professors were still practicing physicians, and schooling was still a profitable enterprise to these physicians. It was just at this time that Koch proposed his theory of the cause of disease and placed the field of medicine in a state of turmoil. German[8] in 1941 reviews the situation as:

> These were revolutionary concepts. To accept them meant discarding all existing texts and rewriting medical knowledge. No compromise was possible between

the strange new claims and old beliefs.

At this same time the industrial revolution began to make its presence felt. A greater number and variety of jobs became available. The standard of living was rising, and in general more wealth was to be had in America. This increase in wealth permitted more money to be spent on the education of the general population. Also, the increase in manufacturing produced a more concentrated populace. These two factors, the increase in wealth and concentration of people, resulted, it seems, in education becoming more desirable and more influential.

Another situation of this particular period was the remote relationship that many medical schools had with universities. This relationship, the increase in prestige of education, and the fact that medicine had 100 years earlier failed to better medical education, caused universities, apparently, to begin revamping their medical departments. Presumably, the majority of the changes from this time on were university in origin. Medical professors became university faculty members. The finances of medical schools were given over to the university treasurer. Laws were passed which reduced the possibility of profits being made from medical education. This eliminated the last reason for the existence of proprietary schools.

Why did physicians not resist to this trend when 100 years earlier a similar trend had failed because of lack of medical support? The reason appears to be a practical one. At the time of the first revision of medical education physicians were scarce. The physicians who were in practice because of their scarcity apparently possessed considerable power. At the time of the second transition in medical education physicians were plentiful—Flexner[7] states 400-500 people per one physician, and individually they possessed relatively little power. It would seem, from the course of events, that professor physicians did not object to the university control of medical education as they had before the Revolutionary War because of the tremendous increase in the number of physicians.

Education, assumed to be in the position of main influence, has directed many of the policies and improvements of medical education in the present century. That this feature has been desirable may be determined from the rise in prestige of medical schools since 1890. Even so, there are some criticisms of medical education which may be directly attributed to the university control of medical education.

In most of the universities in America the policy is to divide education into departments, and those taking courses at the University circulate from department to department. Most of the 82 medical schools are organized in a similar fashion. These university departments are fairly separate entities, with their own department heads and department policies. It seems quite probable that this departmentalization of medical schools by universities is responsible for Atchley's[1] complaint that present medical education should not be broken up into its different medical sciences.

The differences in philosophy of general education and medical education have not been stated, but they have been inferred. These differences in philosophies are, it seems, the reasons for some of the other criticisms which are being recorded. Too much time on insignificant details (Roberts[20], Atchley[1], Berry[2]), the

difference in time of teaching basic science phase and the clinical phase of medicine (Stetten[21]), and the over-emphasis of laboratory technique compared with clinical technique (Peabody[19]) are, it is believed, three such objections.

Because of two wars, better communications and more wealth, scientific knowledge has more than doubled in the last 50 years. This increase in scientific knowledge, apparently, has been the reason for the need of more preparation in medicine. The limit has been reached when this problem can no longer be answered, as has been done in the past, by increasing the time for preparation (Berry[2]). Where 4 years of medical school once sufficed to graduate a physician, now more than twice the time is required. There might be, perhaps, a failing of the present system in its ability to cope with the giant proportions that the scientific field has assumed.

Paralleling the progress of science, medicine, a specialized profession, has been furthered in a similar manner. Not only has the scientific knowledge of medicine increased but the practice of medicine has become more scientific in its methods. Accordingly, the scientific method of the laboratory has become the diagnostic approach of the clinician. While these advancements have been an improvement over the empirical methods of the nineteenth century, there are those who feel that medicine is becoming too scientific (Peabody[19]; Berry[2]). These individuals have stated that the science of medicine is being advanced at the expense of the art of medicine, and clinicians are being replaced by technicians.

Another factor acting on medicine and presumably bringing pressure on medical education is public opinion. The population is becoming more aware of the limitations of medicine. Medical insurance, plans for socialized medicine, increased cost of medical treatment, and charity drives for medical research, all have the affect of bringing medicine into the thoughts of more people. It is reasonable to assume that the more people are aware of medical problems, the more pressure would be brought about to bear for improvement.

The University of Pennsylvania Medical School (Hubbard[13]) has attempted to eliminate some of these complaints by introducing clinical science to 1st-year students. A student is introduced to a selected family and a study is begun in which the student may learn and observe medical problems much sooner than otherwise provided. These 1st-year students are not responsible for medical treatment of any kind: they are merely intermediaries through which the family seeks its medical advice. The families are followed continually for 4 years in order that a long range and varied experience may be gained by the students.

At Harvard University (Berry[2]) in the Graduate School of Arts and Sciences, a different type of program has been inaugurated in the division of medical sciences. (While this program is not part of a medical curriculum, it is believed that its relationship to medicine is close enough to warrant its notation here.) The new program at Harvard is established to give a basic course of 1 year's duration to all students seeking a Ph.D. in any of the medical sciences. The course is taught by all of the departments associated with medical science. Each department, while contributing both professors and material, is integrated into the curriculum by related topics, i.e., cell biology, tissue and organ systems,

respiration, and the body as a whole. When studying each different topic, all aspects of the topic (anatomy, pathology, chemistry, and histology) are taught to the students by the separate departments. It is felt by those who are close to Harvard that integration has been achieved without obliteration of departments.

There are other changes being made in medical education in many medical schools, including those in Boston, Tennessee, Colorado, and Nebraska. Each of these schools is advocating its solution to some of the complaints which have been voiced. In the school of medicine at Western Reserve University an experiment in medical education has begun that is concerned with a complete revision of the 4 years. It is based on several years of research in defining the purposes and in evaluating the methods of medical education.

At Western Reserve University, the problem presented by the enormous heritage of scientific knowledge has been attacked by correlation of the information. By forming subject committees composed of members from representative departments, the great field of science is being trimmed to a smaller area of important principles for the purposes of teaching. Correlation appears to be one process by which selection of subject material could be accomplished. If the selection of important principles is left to separate departments, theories which were unimportant in biochemistry or physiology but important in medicine might receive too little attention.

The conventional educational methods have been changed in several ways in this experimental curriculum. There is a radical departure from the classical university traditions described earlier. One feature has been the treatment of students as mature adults, graduated from 4 years of college and interested in their own progress. Another feature has been more reliance on the student in directing and maintaining his own education. These two features are realized by such practices as no required attendance, a minimum of required tests and standardized class work, initiation of students to scientific research, and allotting of free, unscheduled time for individual development.

With a decrease in emphasis on conventional methods of education, emphasis on clinical medicine appears to be increased by direct and indirect effects. Indirectly, the faculty appears to have increased the influence of clinical medicine by basing the entire curriculum on the concept that the main purpose of medical education is to serve medicine. Directly, clinical science is being taught earlier than the 3rd-year of medical school, and the patient-physician relationship is being taught as the whole relationship about which the practice of medicine evolves. Not so obvious, but just as important is the treatment of students by physicians as colleagues and fellow-doctors.

It is possible that the recent changes in medical education noted above may represent an evolution of another system of medical education. However, it is equally possible that these changes may merely represent minor changes in the university type of medical schools due to the changes and criticisms which time produces in any society-contributing system. The answer will not be known for years. The important feature of these observations is that they are the results of the constantly changing forces which control medical education. And that these forces must be recognized and studied in

order that time will not outmode the prevalent methods of medical education.

Summary

In summary, the author hypothesizes that there are three major influences—the practice of medicine, the field of general education, and the scientific knowledge upon which the practice of medicine is based—working directly and in an integrated manner on the methods of medical education. The hypothesis in analyzing the historical events which may have precipitated three different types of medical educational systems—the preceptorial, proprietary, and university—was an attempt to show that medical education, like any other worthwhile instrument of society, is a logical result of the trends of social and economic conditions. Also, the attempt has been made to show that these trends do not act immediately on medical education but must work on the three major influences. Thus, the practice of medicine, the field of general education, and the scientific knowledge upon which the practice of medicine is based have, it is believed, set limits on the rate and amount of change with which other forces may revise medical education.

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Un estudio sobre la Educación Médica en los Estados Unidos

Los datos presentados en este estudio (que abarca tres siglos) sirven para ilustrar la tesis del autor (de la Escuela de Medicina de *Western Reserve University*), base de toda su investigación, de que el desarrollo de la Educación Médica en los Estados Unidos, como en otros países, depende en gran medida de determinados acontecimientos históricos y de las condiciones económicas y sociales. Los cambios que tuvieron lugar en el *curriculum* médico y en los métodos de enseñanza, no fueron, según se desprende de ese estudio, consecuencia inmediata de las deficiencias que esos métodos mostrasen, sino que, probablemente, fueron resultado directo de tres influencias, las cuales se examinan en este trabajo detenidamente: 1) La práctica de la Medicina; 2) el nivel de la educación en general, y, 3) el estado de los conocimientos científicos que son base de la práctica médica.

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Separatas del artículo completo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

The Relation of Student Anxiety to Concepts of Role in Medical Care*

F. D. McCandless, M.D.† and Morris Weinstein, Ed.D.††

Numerous attempts are being made to include in medical school curricula courses of study and clinical experience designed to broaden the student's concept of medical care.[1-3] The goal of these efforts is the acceptance by students of their patients' emotional and environmental problems as a prerequisite to the realistic practice of medicine and as basic mental hygiene. This paper discusses one phase of the evaluation of such a program of experimental clinical instruction.[4]

The following hypotheses are tested:

1. Anxiety results when a student's preconception of the physician's role is at variance with issues arising in long-term responsibility for medical care to a family. *(a)* The student who limits responsibility to the treatment of organic disease alone experiences difficulty when he cannot reject the patient's emotional and environmental problems. *(b)* The level of this anxiety decreases when a student incorporates a comprehensive approach.
2. The manner in which the student resolves his anxiety tends to fix his role.
3. Learning techniques that allow exploration of anxiety laden areas will stimulate the resolution of conflict between student role-concept and reality issues and will stimulate the development of new conceptions of the physician's role.

Methods

Twenty 3rd-year students, selected by stratified random sampling, were used in this study. Each student was assigned responsibility for the complete medical care of a family for one academic year. The students attended their patients in a Family Care Clinic and at home, under supervision of the staff which consisted of an internist, two pediatricians, a medical social worker, a public health nurse, a psychologist, a psychiatrist, and the program coordinator who served also as public health consultant.

The students met in groups of ten on alternate weeks for student-orientated conferences with the program staff and were told that any issues of concern to them could be discussed. A total of fifteen conferences was held with each group. Following each conference a narrative summary was prepared.

These summaries were examined at the end of the year. Three hundred eighty-four items concerning role and anxiety which were contributed in the conferences were tabulated and studied. For convenience in presenting the data, these have been

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This study is under the direction of J. Garth Johnson, professor of public health and coordinator of the Comprehensive Family Care Program, Albany Medical College, Union University. The total evaluation study includes the anlysis both of small group conferences and specially designed projective tests. Financial support is through a grant from the Kellogg Foundation. The authors are deeply indebted to all members of the instructional team without whose help the evaluation studies would not be possible.

†Associate professor of psychiatry, Albany Medical College, Union University, Albany, N. Y.

††Assistant professor of psychology, Albany Medical College, Union University.

summarized on the basis of three periods: Conferences 1-5, 6-10, and 11-15.

In general, students did not specifically define their concepts of role but rather revealed such concepts through discussion of their goals in patient-care. Therefore, therapeutic aims were tabulated as favoring either (a) goals limited to the care of physiologic pathology or (b) goals inclusive of emotional, social, and environmental factors as well as somatic pathology.

Notation was made of the frequency with which each student revealed anxieties concerning the physician's relationship with his patient or in dealing with his patients' emotional and related problems. The methods by which anxieties were resolved, as well as reports of independent action in the solution of problems, were recorded.

Results

During the last three conferences all students had attempted to summarize their experiences by discussing their patients' current gains and future plans for treatment. On the basis of these comments, students could be classified into three groups, according to their over-all conceptions of the physician's role.

1. *Constricted:* This group of five students showed little concern with the emotional and related problems of their patients. They strongly limited their interest to the treatment of somatic disease as the physician's major responsibility.

2. *Accepting:* Six students simply accepted their patients' emotional and related problems as important to the understanding of patient care, but without attempting intervention in these areas.

3. *Comprehensive:* Six students incorporated these problems as issues of responsibility for physicians in general, and discussed planning for their patients in a broad inclusive way.

Three students could not be satisfactorily classified because of infrequent participation in the conferences.

The three groups of classified students showed no significant difference in over-all attendance and frequency of participation during the conferences. When compared on the basis of individual therapeutic goals, anxiety-producing situations, and attempts at the resolution of anxiety several patterns could be defined.

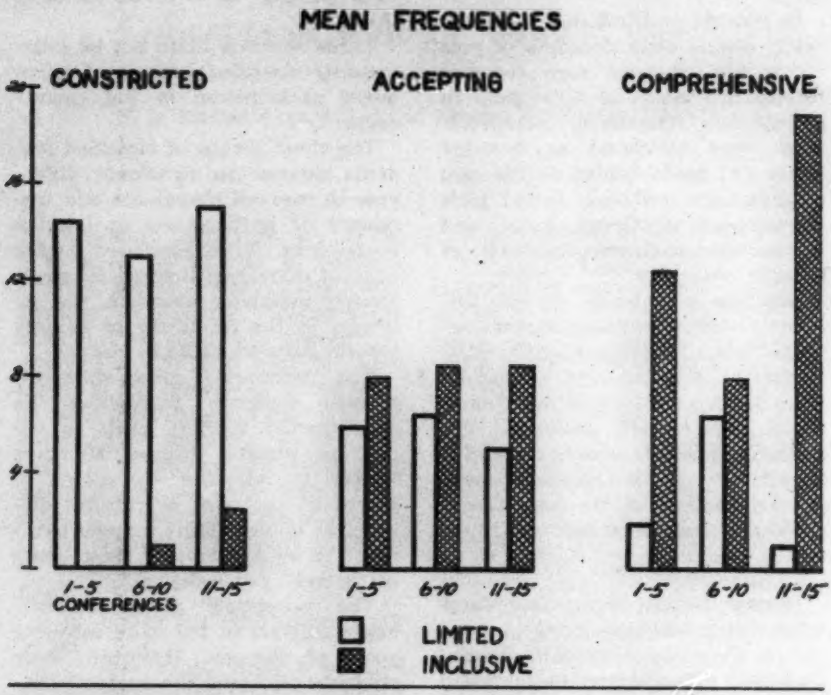
The "constricted" group showed a marked tendency throughout the year toward limiting goals to the care of somatic disease. Members tended to interrupt discussions of emotional problems or cultural differences by describing somatic pathology or by referring to these issues as "merely psychological."

The "accepting" group acknowledged interest in the more inclusive goals of therapy. However, these students projected the responsibility for the solution of emotional problems onto their parents rather than sharing this responsibility. In this group there was also a tendency toward concern over ethical issues such as honesty, "what a doctor ought to do," and the propriety of their own behavior.

The "comprehensive" group was most frequently concerned with issues derived from rather broad, inclusive goals. Students in this group tended to see themselves as responsible for providing help in solving emotional and situational problems, either directly or through assisting in a referral (Chart 1).

A large number of problems related to emotional, social, and environmental difficulties complicated

CHART 1—Treatment Goals



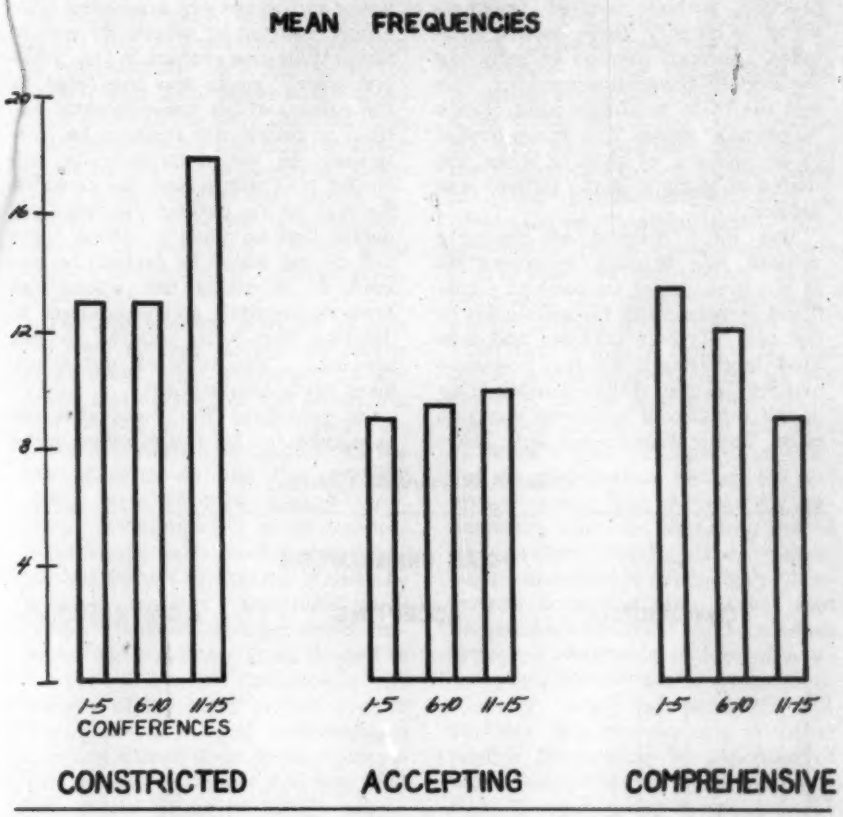
Mean relative frequency of comments defining role expressed as limited or inclusive treatment goals. All tables are corrected for differences in group size.

treatment or were brought directly to the students by their patients with expectations of assistance. Anxieties produced by these problems as well as by broken appointments and other issues involving the physician's relation with his patient were discussed at the conferences. The frequency with which anxiety occurred in each of the three types of student is shown in Chart 2. Those students classed as "constricted" show a rise, while the "comprehensive" group show a relative decrease in the frequency of anxiety. The difference in these two groups progresses throughout the year, so that, by the last five conferences, anxiety is expressed by the "comprehensive" group one half as frequently as by the "constricted" group. The students classified as "accepting" show a somewhat lower initial frequency of anxiety with little change, so that, by the end of the year, anxiety is about as frequent as in the "comprehensive" group.

Anxiety over the diagnosis and treatment of somatic disease disappeared early from the conferences and was not included in this study.

Three methods of resolving anxiety and the related frustration were

CHART 2—Occurence of Anxiety



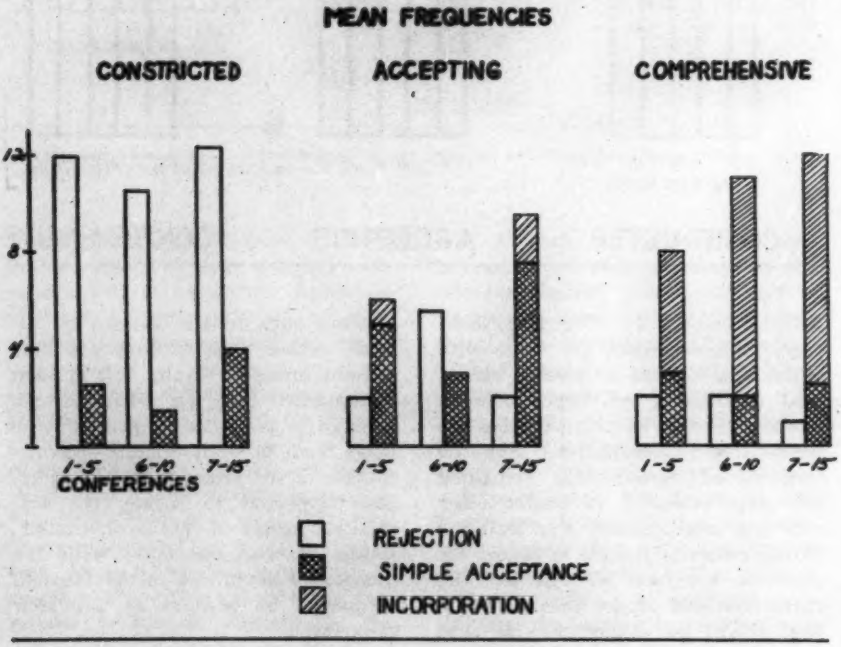
defined (Chart 3). The first technique was to reject the issue with which the student or patient struggled as having no importance in medical care, or as being outside the physician's responsibilities. For the "constricted" group this remained the major solution to anxiety. For example, one student was irritated by his patient's failure to report for chest x-rays and disregarded the man's obvious fright that tuberculosis might be discovered. He sent sputum cups to the patient by his wife, rather than talking with the patient himself. Finally this student commented that he had learned, "that you can't make people, who don't want to, do it." While such rejection of emotional and related issues appeared to satisfy the immediate needs of the "constricted" group, it was associated with the previously noted rise in the over-all frequency of anxiety as the year progressed.

Simple acceptance of emotional, social, and environmental issues as an unavoidable reality of medical practice, without implied responsibility to modify these issues, provided a second method of relieving the anxiety-frustration complex. This was the main technique used by the "accepting" group. This group tended to be relieved of anxiety when the source of anxiety in the patient was defined.

The third method of resolving anxiety was through incorporation of the problem as an issue of significant responsibility for physicians in the care of their patients and was used increasingly by the "comprehensive" group. Active participation in the solution of problems was implied. These students not only initiated discussion of their own patient's emotional and situational problems, but also tended to emphasize such issues in the anxiety-producing situations reported by others. By way of illustration, one student in the "comprehensive" group was frustrated by the refusal of his pre-eclamptic patient to follow the regimen he prescribed. In the conference he discussed his feelings and the probable feelings of his patient. He later reported that he made a routine home call during which he helped the patient to ventilate her resentment towards hospitals and physicians, to describe her fears relative to her pregnancy, and to work out treatment plans comfortably.

In providing the comprehensive care expected by the families, some

CHART 3—Resolution of Anxiety



students gave reports in the conferences of constructive direct action in dealing with the issues usually causing anxiety. Such behavior represented the independent assumption of responsibility as a family doctor to deal with these issues either alone or in consultation with the staff. The frequency of such constructive direct action by the "comprehensive" group was 3 times that of the "accepting" group. Such behavior is completely absent in the group with goals limited to the care of somatic problems alone.

The predominant concepts of role for each student during the earlier conferences were examined. It was found that during the year no student had moved in the direction of increased limitation of goal. Even the five students in the "constricted" group were inclined toward occasional attempts at a more comprehensive approach as the year progressed (Chart 1). Among the twelve students in the "accepting" and "comprehensive" groups, seven initially held treatment goals limited to the care of somatic disease only. By the end of the study period, four of the seven developed role-concepts that had placed them in the "accepting" group, and three concepts that had placed them in the "comprehensive" group. Three of the "comprehensive" students could have been so classed at the beginning of the year. These three seemed to solidify and extend their position with greater self-assurance as the year progressed[1].

Changes in role concept appeared to be related to the reported experiences in medical practice and to changes in attitude developing when anxieties were shared with peers and staff during conferences. Often reality experiences could not be fully assimilated until such sharing took place. At these times the sharing of experience in the conferences led to change in attitude toward the physician's role which has many parallels with what has been described as the corrective emotional experiences in group psychotherapy.[1] This is illustrated by a student in the "comprehensive" group whose initial concept of role was "constricted." In the beginning, his concern was completely limited to his patient's prenatal care. After 3 months he was called dramatically to assist at her delivery. In the next conference he described changes in his patient's attitudes which had developed during the post-partum period. He was uneasy about her requests for reassurance and her increasing use of his services, fearing they represented undesirable dependency. Conference discussion brought out that his patient's behavior represented an increased confidence in him of positive value to both doctor and patient. Actually, when he presented the problem, this student was about to resolve his anxiety by rejection of the patient's need for emotional support. Through group interaction, his anxiety was sufficiently reduced so that for the first time he felt safe in considering his patient's emotional needs. The outcome of this new attitude was manifest when the patient later sought assistance for her four enuretic children. At this time the student was able to help her reveal problems related to the enuresis which she had previously feared telling other physicians.

Anxiety, when shared, was reduced in all three groups and resulted in an increase in the students' sense of security. This often allowed general

[1]Academic standing as revealed by grade point averages showed no correlation with change or lack of changes in role concept, nor were there significant differences in this small sample in the mean grades of the three groups.

issues to be opened for discussion. These issues necessitated further explorations of the physician's role and lead to broader concepts of medical care.

Discussion

On examining performance in terms of medical care to sick patients, the "constricted" group contrasts significantly with the "accepting" and "comprehensive" groups. The latter groups, for the most part, achieved their basic medical objectives. They succeeded in obtaining better follow-up on both acute and chronic illness. These students frequently extended their original goals to include management of previously unsuspected emotional problems. Their continued exploration of the physician's responsibilities in the area of mental hygiene did not hinder treatment of somatic disease, but rather expanded it.

The "constricted" students were less successful than the others in providing the kind of care they most valued. They were left at the end of the year with chronic medical problems which might have been more constructively handled had treatment become a joint effort between patient and student. The student, previously mentioned, who was never able to obtain x-rays on the tuberculosis suspect is typical of this group.

While all students entered the program with varying orientation, more than half started with markedly limited treatment goals. The failure of the five "constricted" students to use optimally the family care experience and to change significantly leaves much room for speculation. It is possible that specific interpersonal problems with patients outside the scope of this study played some part in the "constricted" concept of the physician's role; nevertheless, the focus must, for the present, be upon the student himself. Three of the five "constricted" students showed significant growth in terms of increasing maturity, in a capacity to make independent decisions, and in developing self-responsibility. The other two clarified some of their personal limitations. One reacted excessively to his patient's rather marked dependency. After frequent previous evasion, he was able to clarify this in the last few conferences. The other student conformed superficially. He was unable to integrate his experience and repeatedly isolated problems as either "psychological" or "medical." It was similarly characteristic that he perceived the program as an academic exercise having little to do with actual practice. Although he was able to define some of his own limitations, he seemed the least changed of the actively participating students.

Conclusions

Comprehensive clinical programs of the family care type should be explored further as a resource for the teaching of psychiatry at an undergraduate level. Student-oriented conferences combined with a sustained responsibility for the care of a small number of medical patients provide a setting in which psychodynamic concepts can be integrated into the whole spectrum of medical care. Pressure from peers, as well as contributions from the staff, force consideration of an expanded conception of the physician's role and make possible new solutions to both the students' and the patients' anxieties.

Our limited experience, while not conclusive, indicates the following trends which provide concepts for further examination and follow-up.

1. In providing long-term medical care, students are expected by their patients to deal with many emotional and social problems. When a student's preconception of the physician's role excludes these issues, anxiety and frustration result. The converse is found when he expands his conception of the physician's role to a broad inclusive approach.

2. Anxiety precipitated by the patients' emotional and related problems will influence the student's concept of his role as a physician according to his method of resolving this anxiety.

3. When anxiety is shared in conferences with peers and staff as a corrective emotional experience, it is reduced, and broader concepts of role may be explored. However, while no student in this study moved in the direction of increasing constriction of role, not all students were able to use these learning techniques to optimum advantage.

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El papel del médico, y su relación con el sentimiento de angustia en los estudiantes

De acuerdo con la tendencia a la práctica de la llamada *Medicina Comprensiva* han aumentado los esfuerzos, en las Escuelas de Medicina de los Estados Unidos, por ensanchar los conceptos de los estudiantes sobre lo que ha de ser el papel que el médico desempeña en la sociedad moderna. Esos esfuerzos se reflejan en la introducción en el *curriculum* médico de cursos clínicos experimentales, designados a ayudar al estudiante a resolver los problemas emotivos y de medio ambiente de sus pacientes, ya que se cree que un concepto estrecho de las funciones y responsabilidades del médico, que no corresponde a la realidad, es una de las causas principales de los sentimientos de angustia e inseguridad en los estudiantes. En el presente trabajo (conferencia leída en Nov. de 1956 en Montreal ante la *American Psychiatric Association)*, el Dr. McCandless, Prof. de Psiquiatría, y el Dr. Weinstein, Prof. de Psicología del Colegio Médico de *Union Univ.* (Albany), estudian los resultados de uno de esos programas de instrucción clínica experimental y discuten sus implicaciones psicológicas. Se trata de un curso clínico para un grupo de 20 estudiantes de tercer año de la mencionada Escuela, a cada uno de los cuales fué asignado, durante todo el año académico, el tratamiento médico *comprensivo* de una familia, bajo la supervisión de un equipo de instructores médicos, psicólogos, *social workers* y enfermeras de Salud Pública. Durante ese año los estudiantes se reunieron en grupos de 10, cada dos semanas, para discutir con sus instructores todos los problemas que los preocupasen relacionados con dichas experiencias clínicas. Al final de cada una de esas conferencias (que fueron 15 en total) se hizo un sumario de los problemas discutidos. Sobre la base de los datos extraídos de esos sumarios los autores de este estudio establecen y discuten las hipótesis siguientes: Sentimientos de angustia se producen en los estudiantes cuando ideas preconcebidas sobre la función del médico entran en conflicto con sus experiencias clínicas prácticas. El estudiante que quiere limitar su responsabilidad tan solo al tratamiento de enfermedades orgánicas encuentra graves dificultades cuando se enfrenta con problemas de raíz emotivo y social en un paciente. La angustia tiende a disminuir, sin embargo, tan pronto como el estudiante está dispuesto a abordar dichos problemas de un modo *comprensivo*. La enseñanza de técnicas que le permiten explorar en sí mismo las zonas de angustia, ayudan al estudiante a resolver los conflictos creados por la discrepancia entre sus conceptos y la naturaleza de los problemas reales.

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Separatas del artículo completo, en español, podrán obtenerse si son solicitadas por un mínimum de 25 lectores.

Adapting the Group Discussion Technique for Use with Large Classes

NICHOLAS J. COTSONAS JR., M.D.,* ROBERT J. KAISER, M.D.† and HARRY F. DOWLING, M.D.§

WHITEHEAD HAS DEFINED education as the acquisition of the art of the utilization of knowledge.[1] Teachers of medicine in England and America believe that this objective can be accomplished best during a student's clinical years by small group discussions at the bedside during the course of the clinical clerkship. All teaching during the clinical years cannot be conducted in this manner, however, because this method requires too large a teaching staff. Even if it could, it would be undesirable, because it would prevent each student from coming in contact with many of the senior teachers and the teachers who are experts in certain areas. For these reasons, larger clinics have been used in medical teaching for centuries. These do not have the disadvantages mentioned above, but as is well known, they have many others. Only a few students participate in the discussion, and they are frequently poorly prepared. The clinic discussion is usually a didactic lecture or an oral quiz. Finally, the student does not usually think through a problem but listens to the instructor do this, if it is done at all.

The third-year class of the University of Illinois College of Medicine enrolls 166 students, one-third of whom are assigned each trimester to the medical clinical clerkship during the junior year. Two group conferences are held each week, which overcome some of the disadvantages of large clinics. They retain several of the advantages of the small group discussions that characterize bedside teaching: participation by students, the opportunity to put knowledge to use, and learning through discussion. This paper describes these group conferences and reports on their evaluation by faculty and students.

PLAN OF THE CONFERENCES

A patient was chosen for presentation whose illness would illustrate a clinical problem, such as hematemesis, apoplexy, jaundice, ascites, edema, and so forth. The topic and the patient's name and ward location were announced 1 week in advance. Students were advised to read about the pathologic physiology of the clinical problem to be considered, as well as the important diseases that might cause this condition. They were advised not to confine their reading to the patient's particular disease. The clinical clerk who had been assigned to the patient was instructed regarding the most effective

*Associate professor of medicine, University of Illinois College of Medicine, department of medicine, Chicago, Ill.

†Formerly instructor in medicine, University of Illinois College of Medicine.

§Professor of medicine and head of department of medicine, University of Illinois College of Medicine.

method of presenting the history, physical examination, and routine laboratory data that were obtained on admission to the hospital as facts available to the class for arriving at a diagnosis and planning a program of management.

One of the full-time teachers assigned to junior clerkship teaching acted as moderator. A second instructor acted as "floor-leader." He sat among the students near the back of the room. A guest co-moderator was often invited to participate in the conference. He was a member of the faculty, with a special interest in the [redacted] covered by the topic of the day. [redacted] 30-60-minute pre-conference discussion was held, in which the moderator and the floor leader explained to the guest the philosophy behind the conferences and the technique used. At this time, the problem to be discussed in the conference was considered, and possible areas for discussion were reviewed. Whenever differences in medical opinion developed in the pre-conference discussion, a decision was made as to whether it would be profitable to air these differences in the main conference or not. Usually the decision was in the affirmative.

After the relevant facts from the case history, physical examination and routine laboratory examinations, performed soon after admission were presented by the clinical clerk, the moderator asked the students to question the clinical clerk or the patient regarding additional data. When this phase of the discussion was completed and the patient had returned to the ward, the students were asked an introductory question, and this marked the beginning of the period of group discussion.

The Conduct of Group Discussion

The conduct of group discussion presented two problems—first, the initiation of discussion and, secondly, controlling and directing the discussion of a large group.

a) *The Initiation of discussion.*—In a conference of this nature, the students became unusually vulnerable to the criticisms of their teachers or the ridicule of their fellow students. We reduced to a minimum those aspects students might interpret as threatening. This was accomplished by many devices. Each student who spoke did so voluntarily. Inviting the class to question the patient and the presenting student became a device to get other students talking without feeling unduly threatened. The students were urged not to save their questions until the end of the hour, but to interrupt at the earliest opportunity. Guest co-moderators were not invited to the conferences until students had established a participating relationship with the moderator and floor leader.

Because we wished to emphasize the *utilization* of knowledge, the selection of the topic was an important device in initiating discussion. The questions that were asked of the students required the utilization of knowledge—not the "recalling" of information. Students were invited "to circumscribe the problem presented"—e.g., the patient with myocardial infarction might be circumscribed as a problem in "chest pain." "Recall" questions such as "What are the causes of chest pain?" were permitted only as introductory questions. As soon as a few were mentioned by several students, the emphasis was shifted to justifying a particular cause for the illness under discussion. Whenever a student made a statement, whether his answer was correct or not, someone was invited to challenge his position. When two

opposing positions were developed, it was easy to get other students to extend either one or the other position. It was important that the moderator not identify the correct statement too early, for it was surprising how many students agreed with the incorrect statements, and it was only in this way that the extent of the misunderstanding could be appreciated.

Correct answers were never suggested in questions, because students became self-conscious if made to answer, and incorrect answers were never suggested because the students resented being trapped. It was considered proper, however, for the moderator immediately to restate someone's answer incorrectly, because almost invariably several students began speaking in defense of the first student. Payne has pointed out that respondents show a tendency to choose the alternative they *hear* last.[6] Accordingly, in devising questions intended to stimulate discussions, we placed the incorrect alternative last.

Any question that failed to provoke a prompt response was changed. For instance, "Who believes the patient has tuberculosis?" might be changed to "Who would like to attempt to make the case against tuberculosis?" This was in keeping with the policy of always developing alternatives.

No attempt was made to learn the sources of the students' information. This was rarely productive of information that enhanced discussion because it has been shown that many people can not be relied upon to remember their sources.[6] The most important reason was that the attempts to learn sources stifled discussion because of the embarrassment that ensued. In successive conferences, it was surprising how frequently students began volunteering their sources, as though they hoped the source assumed responsibility for what they were about to say.

b) *Directing and controlling discussion.*—This is the most difficult part of the conference, but all moderators quickly developed facility with increasing experience. Again, many devices were used.

The earlier conferences suffered from too much structuring: the listing of timed segments in which particular points would be developed and the sequence of their development. We discovered finally that it was best to agree on eight or ten major points that could be developed as opportunity appeared during the discussion, but we were always prepared to exploit the unexpected opportunities that developed in spontaneous discussion.

In addition to his contribution to planning, the floor leader played an important role in the conference—by interrupting with the proper question, requesting clarification of some point, or indicating in some way the need and/or method of changing the direction of the conference. The moderators soon learned not to ignore their floor leaders, and they never proceeded without completely understanding the purpose of the interruption.

It was noted that whenever one faculty member interrupted with a question, the audience shifted their attention to him and away from the moderator. By this technique, a guest co-moderator was incorporated into the discussion which he then led for a short time until the moderator felt the time had come to introduce a new aspect.

All soon learned the value of the "rebound question." Whenever a

faculty member asked a question of the person who was conducting the discussion at the moment, the latter *immediately* asked the question of the class without permitting the students to shift their attention away from him. This same technique was used whenever students asked questions of the faculty—the students thereby answering one another's questions.

The co-moderator could be put in charge of the discussion by this same device. He could be asked an introductory "rebound question" which put him in charge of a segment of the conference, because he in turn immediately asked the question of the students and proceeded to lead the discussion.

The moderator has two alternatives whenever he asks a question. First, he may elect to allow responses from several students, each uninfluenced by any part of the discussion which preceded; or, secondly, he may restate or accent in some way (in whole or in part) the discussion of any student and force successive students to answer the question as it has been revised—this we have called "the twist." This second alternative finds its greatest usefulness in controlling and directing discussion, whereas the first alternative is more useful in initiating discussion on a new aspect of the problem.

We would like to emphasize here the importance of "the circumscription of the problem" as a device in controlling discussion throughout the conference. Once a circumscription has been accepted, it determines not only the direction of the discussion, but the ground rules under which certain questions may be ruled out of discussion. In earlier conferences, this circumscription cannot be rushed, and discussion of the circumscription may consume most of the period. We feel this is time well spent, since experience in circumscribing a clinical problem is experience in a logical approach.

The remaining device which was used was the "summary question." Usually most of the misinformation uncovered was corrected in the actual discussion by the class, and the moderator took the opportunity to agree with these corrections at strategic points in the discussion. When it was time to move on to another topic, the moderator asked the invited guest to summarize the gains made up to this point and to add any remarks he wished. This answer had to be brief in order not to allow student enthusiasm to wane. In addition to a short summary, information not yet brought out in discussion was added, if it was considered important or reference was made to information bearing on the discussion which had not been mentioned. Questions were always invited from the students before a new area of discussion was entered.

Discussion in the next period was then initiated by stating the area or problem on which discussion would be welcomed.

Teacher Orientation

The orientation of the teacher was the most important requirement for obtaining the proper atmosphere. The teacher had to be cautioned to avoid any act or expression which students could interpret as threatening. This meant concealing any resentment toward the students because they did not know what the teacher had taken for granted they knew. We found that this was a common and subtle fault.[6] The teacher was reminded that every time he speaks he runs the risk of being misunderstood, at least in part.[3] We found that the opportunity to deal with this misinforma-

tion and misunderstanding was one of the unexpected dividends of the conference. Because it was not easy to provoke responsible discussion, we had to resist the urge to lecture and tried to conduct the first few conferences of each group through the few students who were prepared. Occasionally, one student attempted to monopolize the discussion. He could be controlled by failing to call on him. Frequently, the problem solved itself because students registered disapproval of such a student by groaning, etc.

We have found it advantageous to quickly admit our own mistakes and those made on the ward and to discuss them freely for "the benefit of all." This admission of fallibility (but with honest re-appraisal) and the encouragement of humor (if it is in context[5]) have seemed to neutralize the teacher's appearance of sitting at the head of the table.

Finally, we have found it most profitable (although frequently painful) to seek out and deal with the adverse criticisms of our own use of this technique through discussions with other faculty members present at the conferences and questionnaires anonymously completed by the students.

Student Orientation

We found that proper student orientation required a continuing effort. Initially, we used only the first hour for orientation by a lecture in which we stated the goals and possible gains that could be realized for students by participation in such a conference. Later, we implemented this by restating the goals before each conference. However, it was not until we conducted a group discussion on the conferences themselves that we realized how strong an influence the group as a whole exerted on the individual members.[1] When such a discussion was provoked, the students suggested many criticisms on how the moderator could improve his technique. We found it wiser to welcome this criticism rather than to try to justify everything we had done. After a suitable period of discussion on how the teacher could improve his performance, discussion was next invited on how students could improve their performances. A surprising amount of student discussion in this period identified itself with faculty goals in interpreting the purposes and in "selling" to the group the need to bring individual preparation to the conference.

We emphasized that the conferences were learning sessions and not grading sessions, and stressed the teaching value of the wrong answer. Because it was our purpose to teach and not to inventory knowledge,[6] we welcomed the wrong answer as vital to the technique. We emphasized that, if we were able to direct discussion through a series of questions to the correct answer, every member of the audience was able to answer each question for himself. It was important only that each student knew wherein he had erred, since, if he understood why he had erred, this became a learning experience. The point was made that each student who participated in discussion was discharging his responsibility to the group as a whole by uncovering in others not only knowledge but bits of misunderstanding that could be corrected.

Finally, students were reminded how important was the act of oral communication. It was truly an educational experience for the student who believed he "really knew something" to discover his "knowledge" was evaporating as he began to talk

—he was discovering he didn't have knowledge in utilizable form. The value of this experience was emphasized, and the students were invited to challenge themselves to participate in the discussion of the next conference, since experience showed that, if he had spoken once, he was more likely to make a second utterance than his fellow conference member who hadn't spoken yet.[2]

Evaluation

Questionnaires on these 3rd-year activities were completed anonymously by the students near the end of the senior year—identifying themselves by indicating only in which third of the class they belonged scholastically.

Seventeen of the eighteen faculty members who participated responded anonymously to a similar questionnaire. Six participated in 40-95 conferences; one in over fifteen; nine in five or less conferences, and one failed to indicate his conference experience.

Almost 90 per cent of the class participated (Table 1), and of these only 3.2 per cent (Table 2) limited their participation in the discussion to one of the 23 conferences in the trimester. Almost one-fourth of the class (37.8 per cent of the upper third) participated frequently or usually. In this connection, six of the seven faculty members with the greatest experience (fifteen or more conferences) felt that an increasing number of students entered into the discussion as the term progressed.

All faculty members were agreed that in this type of conference student participation had the potential of increasing their individual skills in communication. Six of the seven faculty members with greatest conference experience stated that they had witnessed such improvement in students' performances. Item 2 in Table 1 substantiates this, since 34.4 per cent of the class (47.2 per cent of the upper third) stated they believed participation had increased their skill in communication.

TABLE 1

Item	Per cent answering: Yes	No	Uncertain
1. Did you ever participate in the discussion?	89.9 (96.3)*	7.6	2.5
2. Did participation contribute to your skill in communication?	34.4 (47.2)	46.5	19.1
3. Did the conferences help you develop a clinical approach to the problems considered?	66.9 (68)	17.2	15.9
4. Did the conferences help you develop an approach to clinical problems in general?	56.0 (60.4)	18.5	25.5
5. Did the conferences as conducted require you to put knowledge to use?	79.6 (92.5)	9.6	10.8
6. Did the conduct of the conferences emphasize the value of reading literature beyond the text-book?	75.2 (86.8)	19.1	5.7
7. Did the conferences bring out controversial points of view and force you to deal with them?	77.2 (85.0)	10.2	12.6

Data are drawn from 157 replies out of a possible total of 162 (97 per cent).
Every student completed the questionnaire except one who neglected to answer one question.
*Figures in parentheses indicate responses of students in the upper third of the class.

TABLE 2

Frequencies of Participation by Groups

Group	Once	Occasionally	Frequently	Usually
	(per cent)	(per cent)	(per cent)	(per cent)
Upper third	3.7	59.0	27.5	9.8
Middle third	2.0	84.0	8.0	6.0
Lower third	5.0	75.0	10.0	10.0
Total	3.2	72.4	15.6	8.8

To preserve the anonymity of the students' comments, they were asked to indicate their class standing which had previously been released to them as their numerical rank in the class by the Dean's office. Of the 157 students responding, 53 reported they were in the upper third, 58 in the middle third and 46 in the lower third.

Items 3 and 4 in Table 1 are of interest, because the faculty members were unanimous in expecting that the goals of developing a clinical approach to the problems considered, and also to clinical problems in general, should be realized from conference participation. Therefore, it was encouraging that two-thirds of the students believed the conferences had helped them to develop a clinical approach to the problems considered, and 56 per cent believed they were helped in developing an approach to clinical problems in general.

It will be recalled that one of the major goals of these exercises was to provide an arena in which students attempted to utilize knowledge —i.e., learn by attempting to put knowledge to use, as opposed to simply recalling facts. Items 5, 6, and 7 bear on this point. Almost 80 per cent of the class felt that the manner in which the conferences were conducted required students to put knowledge to use (92.5 per cent of the upper third). This opinion was shared by sixteen of the seventeen participating faculty members.

Item 7 supports this point, because 77.2 per cent of the class (85 per cent of the upper third) believed that the conferences brought out controversial points of view and forced students to deal with them. Six of the seven faculty members with the greatest experience agreed with this position.

It was mentioned earlier that the students began quoting from the literature to support the points they made in discussion. Item 6 indicates that 75.2 per cent of the class (86.8 per cent of the upper third) felt that the conferences emphasized the value of reading literature beyond the textbook.

We turn now to a consideration of the data in Table 3. The conferences were planned and conducted in a manner that utilized knowledge in the hope that a significant proportion of the class would be stimulated to prepare for the conferences. It was encouraging, therefore, that 79 per cent of the students stated that it was necessary to prepare for these conferences in order to gain from them, and that 83.4 per cent believed that preparation made a significant difference in the gains from participation.

The final item in this chart indicated that 46.5 per cent believed that

TABLE 3

An Estimate of the Importance of Preparation

Question	Per cent answering: Yes	No	Uncertain
Do you believe it was necessary to prepare for these conferences in order to gain from them?			
Upper third	85.0	15.0	—
Middle third	77.6	17.5	4.6
Lower third	74.0	19.6	6.4
Total	79.0	17.2	3.8
Do you think preparation for these conferences increased significantly the gains from these conferences?			
Upper third	92.5	3.8	3.7
Middle third	82.7	6.9	10.4
Lower third	73.0	8.7	18.3
Total	83.4	6.4	10.2
How important was this increased gain, through preparation, in educating you to bringing preparation to the conference?	Very important	Made no real difference	Uncertain
Upper third	54.7	24.5	20.8
Middle third	39.7	41.4	18.9
Lower third	45.7	28.3	26.0
Total	46.5	31.9	21.6

recognition of the value of being prepared had educated them to prepare.

In Table 4, an attempt was made to assess the reactions of students to the discussion of their fellow students. Thirty-seven per cent stated this was the stimulus to prepare (45.3 per cent of the upper third), and 38.2 per cent stated this was the stimulus to participate (47.2 per cent of the upper third). The uniformity of the proportion who felt resentment towards their fellow students throughout all levels of the class is interesting—12.1 per cent. This response was most obvious to the faculty early in each series of conferences and tended to decrease with time.

Whenever students attempt to put knowledge to use, a major by-product is the uncovering of misinformation and misunderstanding. All faculty members agreed on the value of this type of conference in presenting the opportunity to deal with this by-product, but only 59.2 per cent of the class felt the time spent in this area was valuable, and 44 per cent felt the time spent in this area was excessive. One faculty member of the eighteen agreed with this position (Table 5). The seven faculty members with the broadest conference experience felt that the misinformation and the misunderstanding were adequately handled in the conference discussion.

Finally, the questionnaires contained a series of questions that attempted to gain an over-all opinion from the students and faculty:

a) Since large group discussions

TABLE 4

The Stimuli of Group Participation

Question: When you saw and heard your fellow students actively participating in the discussion, what effect did it have on you?

Figures indicate per cent answering.

Group	None	Provoked a feeling of resentment	Stimulated me to prepare	Did not stimulate me to prepare
Upper third	9.4	13.2	45.3	7.5
Middle third	13.8	12.0	31.0	5.1
Lower third	15.29	10.9	34.8	4.4
Total	12.8	12.1	37.0	5.7

Group	Stimulated me to participate	Did not stimulate me to participate	Uncertain	Made me envious (written in by students)
Upper third	47.2	11.3	5.6	—
Middle third	36.3	6.9	13.8	3.4
Lower third	30.5	15.2	8.7	2.2
Total	38.2	10.8	9.6	1.9

TABLE 5

Misinformation and Misunderstanding

Question	Per cent answering: Yes	No	Uncertain
Do you feel the time spent in dealing with misinformation and misunderstanding uncovered in discussion was valuable?			
Upper third	66.0	24.5	9.5
Middle third	58.6	24.2	17.2
Lower third	52.2	23.9	23.9
Total	59.2	24.2	16.6
Do you feel too much time was spent in dealing with misinformation and misunderstanding uncovered in discussion?			
Upper third	43.5	39.6	16.9
Middle third	43.2	46.5	10.3
Lower third	45.7	37.0	17.3
Total	44.0	41.4	14.6

obviously have deficiencies not encountered in small group discussions, we asked the negative question as to whether the deficiencies of these conferences out-numbered the advantages. Among the students, 22.9 per cent felt that they did, although only 7.5 per cent of the upper third expressed this opinion. None of the seven faculty members with the most experience agreed.

b) Students and faculty were asked whether these conferences contributed something to the teaching program that was not adequately handled elsewhere. A negative answer was obtained from 24.2 per cent of the class (11.3 per cent of the upper third) and one of the seventeen faculty members.

c) When we asked whether the conference time could have been spent more profitably in some other activity, 26.1 per cent of the class (15.1 per cent of the upper third) and one of the seventeen faculty members answered "yes." This percentage represents 41 student replies, but only 25 students availed themselves of the opportunity to make suggestions. Only three students (and the one dissenting faculty member) suggested "smaller group discussions." The remainder of the student suggestions were almost equally divided among the following—more ward time, more time to read, quizzes on a standard text, more lectures or nonparticipating clinics.

d) Students and faculty were asked whether they had enjoyed their participation in these conferences. Fourteen per cent of the class (1.9 per cent of the upper third) stated they had not. The faculty stated unanimously that they had, and five of the seven members with the greatest conference experience felt their individual participation had helped them establish rapport with the class.

Discussion

In small group discussions, preparation and participation can be required. All students become well known to the instructor who can seek each student's opinion on every point discussed. In addition, students know their performances in these small group discussions determine a major part of their grade. Finally, the risk of exposing oneself to ridicule in small group discussions is not as great as it is in large group discussions.

In this large group discussion, we did not expect to achieve the goal of preparation and participation by all. However, through the use of many devices, we believe we have demonstrated it is possible to conduct a discussion with a large group of students in which active use is made of their preparation and in which the majority can put their knowledge to use in solving clinical problems.

We are pleased with the number of students who did prepare, because they became aware of increased gains from the conferences through participation. We are surprised and pleased at the number of students who admit they were provoked to prepare and to participate because they saw and heard their fellow students participating actively in the discussions.

One of the main products of this type of student discussion was the uncovering of misinformation and misunderstanding as well as the development of information and understanding. This was a "feed-back"[4] (from students to teachers) which the lecture technique does not provide, except through examination. The opportunity to deal with this misinformation became a learning experience for students. It was apparent, however, that this was a more important opportunity in the eyes of the faculty than it appeared to students, because the students would like to spend most of the time exploring the clinical problems.

We have not compared the effectiveness of this form of teaching with other techniques, because we placed our emphasis on encouraging student preparation and participation by providing an arena in which students could put to use knowledge gained *elsewhere*.

We did subject to statistical analysis the answers to the questionnaire of the upper and lower thirds of the class. In the following instances, there was a statistically significant difference in the favorable answers of the upper third when compared

with the answers of the lower third (the Chi-square test was used, and the "uncertain" responses were included with the unfavorable responses).

a) The conferences did require students to put knowledge to use ($P < .01$, Table 1, item 5);

b) The conferences did emphasize the value of reading literature beyond the text book ($P < .01$, Table 1, item 6);

c) The deficiencies of these conferences were *not* more numerous than the advantages ($P < .01$);

d) Preparation for these conferences did increase significantly the gains from these conferences ($P = .01$, Table 3, middle item).

e) More students from the upper third participated in the discussion when compared with the lower third of the class ($P = .03$, Table 1, item 1).

f) Participation in these conferences did contribute significantly to their skill in communication ($P = .04$, Table 1, item 2).

These data would suggest that this conference activity has a significantly greater appeal for the upper third of the class.

Summary

We have described a method whereby the group discussion technique can be adapted for use with groups of 50-55 students. This was accomplished in part by paying considerable attention to the orientation of teachers as well as of students, by reducing those aspects that students found threatening, and by using other methods of stimulating students to prepare and participate. The problems of initiating, directing, and controlling discussion have been handled by using the same moderator for a set of conferences, a floor leader, and devices including recall, rebound, alternative, and summary questions. Other faculty members have been introduced to the technique as guest co-moderators, moderators, and floor leaders.

The results of questionnaires completed anonymously by faculty and students supported the position that the potential goals had been realized to a large extent and that it is possible to adapt the group discussion for use with large classes.

Acknowledgement

The authors wish to thank Mr. Eddie Eckert for the statistical analysis.

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Un nuevo método de discusión clínica

Aunque se considera que el mejor método de enseñanza clínica para estudiantes de tercer año es la discusión, junto a la cama del paciente, entre el instructor y un pequeño número de estudiantes, sólo raras veces se puede llevar a cabo ese procedimiento debido a la escasez de instructores y al creciente número de estudiantes. En el presente trabajo se describe un procedimiento, ensayado recientemente en la Escuela de Medicina de la Univ.

de Illinois, mediante el cual se trata de adaptar la técnica de discusión en grupos pequeños a grupos de 50 a 55 estudiantes, convirtiendo lo que antiguamente habían sido conferencias clínicas puramente didácticas en discusiones organizadas en forma tal que permitan la máxima participación activa de los estudiantes. Los resultados de un cuestionario, circulado entre profesorado y estudiantes, indican que el nuevo sistema alcanzó en gran medida los objetivos propuestos.

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Separatas del artículo completo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

Traffic Rules for Selection of Students

1. No place in the freshman class shall be offered to an applicant more than one year before the actual start of instruction in that class.
2. Following the receipt of an offer of a place in the freshman class, a student shall be allowed at least two weeks in which to make a written reply to the medical school.
3. Prior to January 15, this written reply may be either a declaration of intent or a formal acceptance of the place offered. When the applicant has declared his continued interest within the two-week period, the medical school agrees to hold a place for him until January 15, unless he indicates that he has been accepted elsewhere and withdraws his application. He may, of course, and often will, enter into formal arrangements with the one medical school of his choice before January 15. Because of the wide variation in the acceptance dates of different medical schools, some students will wish to change their minds after filing a declaration of intent and it is understood that nothing unethical is implied when a student does so change his mind. In such an event, the student is obligated to send prompt written notification to every school holding a place for him.
4. The payment of a nonrefundable deposit shall not be required of any applicant prior to January 15.
5. When a student files a declaration of intent, a refundable deposit—not to exceed $100—may be required at the discretion of the school granting the acceptance. Such deposits will be refunded without question upon request made prior to January 15.
6. The deposit, when required to hold a place in the freshman class after January 15, shall not exceed $100.
7. By January 15 each applicant for whom a place in the entering class is being held must either accept the offer formally and pay any required nonrefundable deposit or withdraw his application.
8. Following January 15, an applicant offered a place in a freshman class must either formally accept or refuse the place, but he shall have at least two weeks in which to decide. Deposits made after January 15 shall be nonrefundable.
9. To assist the medical schools, the AAMC office will compile a list of the students who have formally accepted a place in the freshman class. This list will be distributed about February 1 and will be kept current by frequent revisions.

Adopted by the Executive Council of the Association of American Medical Colleges at its 65th Annual Meeting.

A Teaching Model of the Electrocardiograph*

ROGER MERRITT MORRELL, M.D.†

INTRODUCTION

THE ELECTROCARDIOGRAM is a biophysical determination which has an important place in the teaching of the processes of myocardial excitation, the clinical diagnosis of myocardial pathology, and in certain research methods relating to cardiac disease. The present communication describes a laboratory method for simulating the depolarizing forces of the myocardial membrane and recording them graphically and instantaneously as they occur. For teaching purposes, this model may clarify concepts which remain obscure when the actual electrocardiograph is used, since, in the model, the "axis" of the heart can be manipulated and the "rate" can be altered.

MATERIALS AND METHODS

Teledeltos® conducting blotting-type paper moistened with NaCl is used to simulate the volume conductor of the body (See Chart 1). A simple thyratron or similar relaxation oscillator furnishes a pulse analagous to the pacemaker's impulse in the septal bundle before it divides to supply the two ventricles[1]. This impulse is delivered through a standard electrical paired "banana plug," the two poles of which represent the oppositely charged sides of the myocardial membranes[2].

The clip leads (placed on the two arms in the position of Lead I in Chart 2) are equivalent to the galvanometer poles and record the field created by the potential difference between the banana plugs or "pacemaker." The deflection is led to a CRO where it is displayed as a typical oscillographic plot of voltage against time. As seen in Chart 2, the amplitude of the deflection will depend on the direction of the vector (field) relative to the axis of the lead. In demonstrating this, the leads may be changed with the banana plugs held in one place, or the "pacemaker" may be rotated through various angles with the lead axis, to show the change in amplitude of the deflection on the oscilloscope tube-face. In addition, "precordial" deflections may be simulated by holding the "pacemaker" constant and moving one clip lead through different positions across the "chest," recording the potential difference with respect to an indifferent electrode placed at the crotch or at one leg. This "precordial" lead is not the same as the Wilson method in which the indifferent electrode consists of a central terminal constructed by joining electrodes placed upon the two arms and the left leg with 5000-ohm resistances placed between the electrodes[3]. If the stimulator (pacemaker or oscillator) delivers pulses

*Demonstration performed for the National Association of Science Teachers, November 1955.

†Formerly senior assistant surgeon (clinical associate in neurology), The National Institute for Neurological Diseases and Blindness, Bethesda, Md.

CHART 1

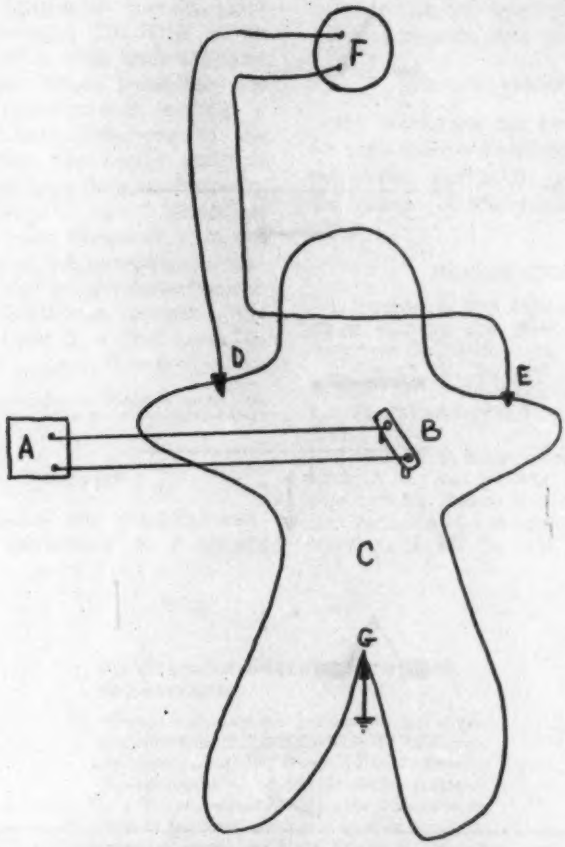


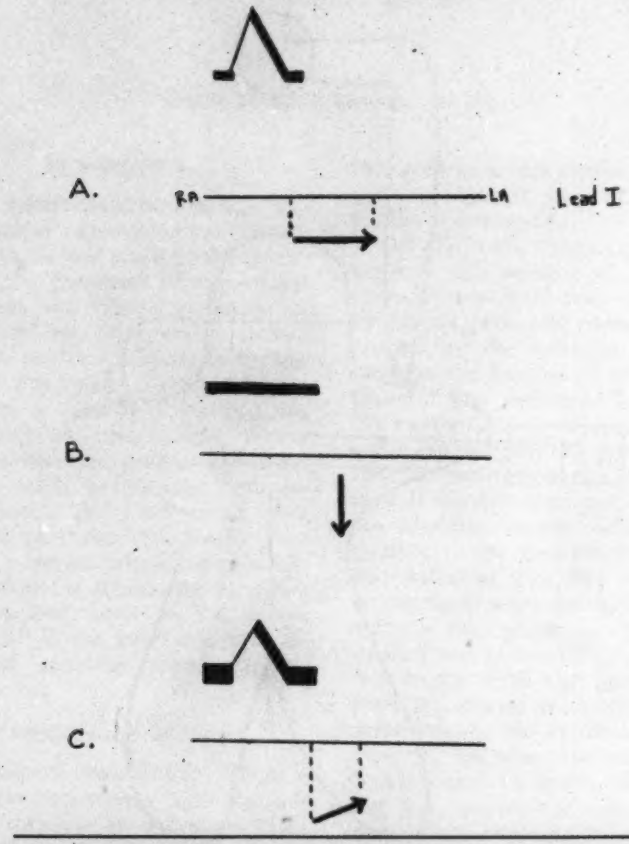
Diagram of electrocardiographic model. (A) relaxation oscillator (pacemaker); (B) Paired banana plugs (myocardial membrane); (C) "Teledeltos" conducting paper (volume conductor of body); (D) (E) Clip leads placed in position for recording Lead I; (F) CRO; (G) Ground lead for use as indifferent electrode against which "precordial" (unipolar) potentials are recorded.

of sufficient voltage, no amplification will be necessary; otherwise, a low-level pre-amplifier will be necessary to increase the signal before it is put into the CRO. The use of an audio amplifier and speaker add little to the understanding of the principles involved, but may heighten the effect of the demonstration for teaching purposes.

DISCUSSION

The standard ECG deflection may have both upright and inverted portions, owing to the variation in magnitude of the instantaneous vec-

CHART 2



The amplitude of the deflection depends upon the direction of the vector relative to the direction of the axis of the lead. (A) The vector is parallel with the axis of the lead, and the maximal deflection is written. (B) The vector is perpendicular to the axis of the lead, and no deflection is written. (C) The vector is oblique to the axis of the lead, and the amplitude of the deflection measures the magnitude of the component of the vector on that lead axis. In (A) and (C) the component is directed toward the positive pole of the lead, and therefore positive or upright deflections are written.

tors of a single *QRS* or *T* cycle. The deflections obtained with this model will be of one polarity but will vary in amplitude from zero with the axis of the plugs at 90 degrees to the axis of the lead, to a maximum with the axis of the plugs parallel to the lead axis.

The direction of the deflection, as seen on the CRO (whether upright or inverted), can be determined by reversing the leads from the oscillator to the banana plugs, thus reversing the poles of the "pacemaker." By adjusting the gain of the CRO, it is possible to make careful measure-

ments with the marked scale of the tube-face, in order to demonstrate Einthoven's Law for the three leads, in terms of amplitude—namely, Lead II—Lead 1+Lead III. This is an adaptation of a well known physical principle. When potentials are measured consecutively among a series of points, returning to the original point, the vector addition of all these potentials equals zero. Therefore the *QRS* and *T* deflections of I+II+III=0. Presumably, in order to observe the physical convention of having upright deflections in all leads, Einthoven reversed the polarity of Lead II, so that Lead I+Lead III+C (—Lead II)=0[1].

[1]There is a similar relationship among the three unipolar limb leads, the circuit here being: VR+VL+VF=0.

® Reg. T. M.

Summary

1. Theoretical and practical considerations pertaining to a simple model for demonstrating Einthoven's Law are presented.

2. Such a model would appear to be useful in the teaching of general science, physics, and physiology.

Acknowledgments

My thanks are due Dr. K. S. Cole, for the supply of Teledeltos® conducting paper, and to Dr. K. Frank for the design of the relaxation oscillator.

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Un electocardiógrafo para fines de enseñanza

Después de explicar brevemente los principios que rigen el funcionamiento de los electrocardiógrafos, el Dr. Roger Merritt describe detalladamente un modelo de electrocardiógrafo designado especialmente para demostrar en clase el funcionamiento y efectos de esos aparatos, así como las leyes físicas en que se basan. El autor cree tal modelo ha de tener utilidad especial en la enseñanza de Física y Fisiología.

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Separatas del artículo completo, en español, podrán obtenerse si son solicitadas por un mínimum de 25 lectores.

The Multidiscipline Laboratories *

EDRA SPILMAN, PH.D.†

THE MULTIDISCIPLINE LABORATORIES at the School of Medicine were designed to implement the major objectives of the integrated medical education program which are to provide the student with adequate knowledge and skill, to foster proper attitudes, and to develop habits of self-education.

Plans for the laboratories were begun in 1948 by the committee on curriculum and instruction under the chairmanship of Dr. R. F. Parker. In 1951 detailed planning was initiated through the subcommittee on facilities for students by Dr. L. O. Krampitz, chairman, and Drs. N. L. Hoerr, W. McK. Jefferies, A. R. Moritz, W. Sakami, E. E. Selkurt, A. D. Welsh, and J. W. Patterson '49. Designs for laboratory layout and furniture were done by Leon Gordon Miller, Cleveland; architects were Garfield, Harris, Robinson and Schafer, Cleveland; the laboratory benches and desks were manufactured to specifications by the Variety Cabinet Company, Cleveland, and chairs were obtained from the Toledo Furniture Manufacturing Company, Toledo, Ohio.

FUNCTIONS

The first function of the multidiscipline laboratories is to give each student his own single work area in which all laboratory exercises can be performed. This is in contrast with the type of curriculum in which each department operates a laboratory for its own teaching program.

Less obvious is the second function—that of giving each student the feeling of "belonging" by assigning him to a "home base." This personal work area is available to the student 24 hours a day, seven days a week through the year, and provides one of the benefits routinely given to graduate students.

The third function is to centralize and coordinate laboratory operations from the standpoint of logistics and personnel. Previously each department supplied a part-time helper. With the present facilities two full-time helpers (one for Phase 1 and another for Phase 2) are needed to prepare for laboratory exercises during the school year, and to repair and stock during slack seasons.

THE THREE LABORATORIES

There are three multidiscipline laboratories: one for the first year (Phase 1) on the fifth floor of the School, one for the second year (Phase 2A) in the basement of the School, and one for the first half of the third year (Phase 2B) on the first floor of the Institute of Pathology.

PHASE 1. The phase 1 laboratory is a departure from the customary single large facility. There are six small rooms—five for sixteen students and one equipped for twelve. In each of the rooms (with the one exception) there are two movable benches on either side of each of four sinks, and writing desks are along the wall. An accessory work table is used for communal equipment and supplies, and large "green" blackboards are at either end of the room.

*Reprinted with permission, from the Western Reserve University School of Medicine, Alumni Bulletin, Second Quarter 1957.

†Laboratory Manager, Medical Curriculum, Western Reserve University, Cleveland, Ohio.

FIGURE 1. Phase 2B Laboratory

Accessory rooms, located along the center hall of the fifth floor, include an animal room, cold room, stock room, and physiology preparation rooms. The fifth floor is lighted by "Day-Bright" fluorescent lighting, has no windows, and is air conditioned. (The animal room and stock room are air conditioned, but are vented to the outside of the building.) This floor was constructed for ultimate use for experiments with small animals, and easy conversion is possible.

PHASE 2A. The Phase 2A laboratory is one large area (140′ x 22′) with facilities for 80 students. The room can be subdivided into 10 smaller units by folding plastic doors. Each unit has four movable benches grouped around a sink. There are windows along one of the walls and communal accessory shelves along the other. The laboratory opens into a main corridor by six doors. Animal and stock rooms are located on the opposite side of this corridor.

PHASE 2B. The Phase 2B laboratory (Figure 1) in the Institute of Pathology, is used primarily for microscopic studies and has desks and work benches accommodating 82 students. Stock and accessory rooms are along the hall into which the laboratory opens.

ANATOMY DISSECTION. During the first year, dissection of the stillborn infant is performed in the Phase 1 laboratory with specimens stored on the same floor in a cold room. The infant cadavers are wrapped and kept in individual, covered, stainless steel trays. An adult human cadaver is

dissected during the three semesters of Phase 2 and the specimens are kept and dissected in the dissecting room of the department of anatomy, first floor of the School of Medicine.

The Laboratory Bench

The laboratory benches were designed around a study of equipment used by all of the departments involved in multidiscipline teaching. The benches accommodate the various types of equipment originally contained in the benches of departmental laboratories. In addition, provisions were made for specific types of equipment, such as kymographs, built-in brass flanges for kymograph rods, space to house microscopes, and long drawers for burettes.

A laboratory bench in Phase 1 is shared by two students (Figure 2). It has a surface work area of 3′ by 5′, a height of 36″ and is designed for the student to stand. One end adjoins a side of a sink where gas, air, and vacuum lines are provided for each student, and over the sink is a provision for glass drying and distilled water storage. The bench contains two sets of 5 drawers of varying depth, two locked cabinets, and one locked drawer. The bench, mounted on casters, may be moved but it remains connected to electrical current by heavy duty extension cord.

The Phase 1 desk (Figure 3) has a working area of 2′ by 3′, is 29″ high and is designed for the student to be seated. It contains a locked bookcase running the full width of the desk above and a drawer and pull-out board beneath the writing surface. The chairs are of metal structure with plywood swivel seats and backs.

Figure 2. Phase 1 Laboratory Bench

FIGURE 3. Phase 1 Desk

Phase 2A benches (Figure 4) provide areas for laboratory work and for study. Two kneeholes permit the partners to study or work at the same time. Each student has a drawer and cabinet space extending from the top of the desk to the floor on opposite sides of the bench. These desks are mounted on casters and connected for electrical current by heavy duty extension cords. In the long range planning the ultimate use of the Phase 2A laboratory will be for dental students.

GENERAL FACILITIES

Phase 1 and 2A laboratories have independent animal rooms reserved for student use. Equipment includes metabolism cages for rats and dogs, and cages for the general care of small animals (rats, guinea pigs, mice, rabbits, and chicks).

Phase 1 laboratories have been provided with a cold room for the storage of anatomical specimens. The refrigerator measures 8′ by 11′ and has wooden shelves along two sides. The Phase 2A and 2B refrigerators have a 20 cubic feet capacity.

Each of the three laboratories has an independent supply of distilled water. The Phase 1 still has a capacity of 30 gallons per hour, and the excess supply is used by other departments. The Phase 2A and 2B stills each produce 5 gallons per hour which is sufficient to supply student needs. The distilled water is dispensed to the students from 5 gallon reservoir bottles suspended over each sink. From this reservoir there are two outlets. The bottles are connected to central reservoirs having capacities equal to the maximum an-

ticipated use and are equipped with overflow check valves.

The Phase 1 laboratories have a 2-way intercommunication system (Teletalk, Western Electric) which allows communication between the office, stock room and any of the rooms and can be controlled from either the office or stock room. Phase 2A and 2B laboratories have individual public address systems. In each of the three laboratories each student has a coat locker with combination lock located near his own facility.

Laboratory Operation

At the beginning of the school year each student selects a partner and the pairs are assigned at random throughout the laboratories.

Subject committees prescribe the laboratory exercises and provide instruction. The Laboratory Manager is responsible for obtaining the program of experiments from the Subject Committee and for preparing the equipment and reagents for testing certain experiments in advance.

In the Phase 1 laboratory one instructor is present in each of the six units during an experiment. The six instructors usually consist of three or more faculty members and three graduate students or senior medical students serving as instructors. Usually, one faculty member and one graduate student or senior medical student serve together in adjoining laboratories. Most of the faculty is provided by the departments whose

Figure 4. Phase 2A Laboratory Bench and Study Bench

methods and subjects are to be demonstrated in the exercise.

Close liaison between the Laboratory Manager and the faculty member responsible for the exercise is required. The burden of preparation is removed from the staff by maintaining adequate equipment and supplies in the stockrooms and regulating their flow to the laboratories. This is done by the Laboratory Manager and the two stockmen who have been trained to prepare solutions, repair, construct, and maintain equipment, to control inventory, and to be aware of their responsibility to the teaching program as a whole.

Prior to the presentation of each exercise the laboratory syllabus is analyzed for supply and equipment requirements. On the basis of these analyses, "Work Orders" are prepared by the Laboratory Manager and issued to a stockman, graduate students, and senior medical students who must prepare and test solutions and equipment. In addition, the stockman receives instructions for dispensing equipment needed by the student to supplement that in his desk and for preparing the laboratory for the exercise. Usually the Subject Committee representatives perform each exercise beforehand using equipment and reagents identical to those to be used by the students. The required number of bottled reagents and supplementary equipment are distributed to the student laboratories. Colorimeters, water baths, and centrifuges are placed on the communal accessory tables. At the end of each exercise the students leave the supplementary equipment on top of their benches where it is picked up immediately by the stockman to be cleaned and prepared for re-use or storage.

Microbiology experiments require a different procedure. The department of microbiology supplies all sterile media and glassware as well as cultures. The stockmen are responsible, by "Work Orders," to obtain the proper material from the media room of the department of microbiology, to dispense it, and return all contaminated glassware and media to be sterilized.

Slide collections for histology, pathology, hematology, and neuroanatomy are maintained by the respective departments. The stockmen distribute and collect them as requested. Gross specimens for anatomy and pathology are the responsibility of the respective departments.

Financial Aspects

A central stockroom supplies glassware and rubber goods to all laboratories in the School. Early in the establishment of the multidiscipline laboratories it was observed that the type of supplies to be stocked could be purchased at a considerable saving if it were possible to take advantage of the maximum discount prices.

The central stockroom is managed by the Laboratory Manager and deliveries are made to the Phase 1 stockman. A modified double entry bookkeeping system is used together with a Kardex perpetual inventory system. Orders are taken by telephone and by requisition with delivery usually made in 24 hours. All accounts are billed for purchases at the end of the month by internal charge memoranda at current catalogue prices.

Although it is clear that the present operation is considerably less expensive than that under the old curriculum, no comparison can be made between the costs for laboratory operation. Since the present bookkeeping system covers both the expenses of the student laboratories and the

central stockroom it is difficult to calculate the cost of the student laboratories alone. It is estimated, however, that the operating cost of the three teaching laboratories is approximately $27,000 including $15,000 for salaries, $3,000 to $3,500 for animals, and $3,000 for glassware, hardware, new equipment, maintenance of facilities, and office expenses.

For listings of equipment provided in student desks, physiology kits, and equipment supplied by the students; laboratory floor plans; inventory, budget appropriation and financial statements for maintenance of the three laboratories, write Dr. Edra Spilman, Phase Laboratory Manager, School of Medicine, Western Reserve University, Cleveland 6, Ohio.

Los laboratorios de la Escuela de Medicina de Western Reserve University

En este artículo se presenta un detallado informe sobre el planeamiento, construcción y funciones de tres laboratorios pertenecientes a la Escuela de Medicina de *Western Reserve University*, en Cleveland (Ohio). Dichos laboratorios, cuya construcción es parte de un reciente programa de Medicina *integrada*, están equipados en forma tal que sirven simultáneamente a todos los Departamentos de la Escuela, en contraste con el tipo usual, designado para uso de un solo determinado Departamento. La función primordial de esos *multidiscipline laboratories*, según el autor del informe, consiste en "dar a cada estudiante su área propia de trabajo, en la que pueda llevar a cabo, independientemente, todos sus ejercicios de laboratorio." Otra función importante es la de centralizar y coordinar las diferentes operaciones de laboratorio de todos los Departamentos de la Escuela.

Separatas del artículo completo en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

Editorials and Comments

An Important Survey

THE DIVISION of Medical Sciences of the National Research Council has undertaken a survey of the impact of fellowship programs on the medical schools and the medical sciences. By initiating this important study, the National Research Council hopes to provide a platform for future planning of fellowship programs at the pre-doctoral, post-doctoral and faculty levels.

Of particular interest to medical educators should be the concern of the survey with the relationships between fellowship-supported young medical scientists and the medical schools with which they are affiliated. Certainly, there is reason for determination of the impact of outside support on academic loyalty and faculty traditions.

Through questionnaires to medical scientists who have held fellowships since World War II and to the chairmen of major medical school departments a great deal of valuable information has been gathered. The analysis and interpretation of the material rests with the Medical Fellowship Board under the Chairmanship of Dr. Sam L. Clark of Vanderbilt University School of Medicine. The director of the survey is Dr. Arthur S. Cain. *J.Z.B.*

Medical Education Week—1958

MEDICAL EDUCATION WEEK was instituted in 1956 at the suggestion of the National Fund for Medical Education and the American Medical Education Foundation. It was felt that an intensive effort to inform the public concerning the needs of medical schools would enhance the fund-raising programs of these groups. All evidence supports the belief that Medical Education Week is an important part of the program for financial aid to medical education.

This year, Medical Education Week has been set for the period beginning April 20, 1958. It is hoped that through mass media, discussions before civic groups and contacts with medical societies, a greater degree of public and professional awareness of our needs will be stimulated.

Recent developments in outer space must not be permitted to distract attention from the need for development of knowledge on inner space. The people of the United States have never been so hungry for knowledge concerning education in the sciences. Medical Education Week, 1958, should be and must be actively supported by medical educators.

The dollars received from the National Fund for Medical Education and the American Medical Education Fund are often cited as the "best" money that we receive. Participation in Medical Education Week will pay rising dividends in this "best" money. *J.Z.B.*

LETTERS TO THE EDITOR

A Useful Adjuvant in the Teaching of Medical Pharmacology

FOR SEVERAL years, the department of pharmacology of the school of medicine of the University of Maryland has been conducting a series of group discussions or seminars with the students as a part of its teaching program. These seminars are known among the students as "pharmacology teas," since cigarettes, light refreshments and tea are served to create an atmosphere of informality. The seminars are held twice a week, with five or six staff members and four students. Several of the seminars are devoted to questioning of the students informally on the subject matter current in the course. In others, the students are assigned topics for the purpose of presenting a 15-minute lecture embracing a review of pertinent literature. For example, the subject of the origin and treatment of cough is typical of one of the seminars. Each student speaks on a special facet of the subject, such as etiology, signs, symptoms, and diagnosis; choice of drugs in treatment; mechanism of action of the drugs; and the prognosis under treatment.

Congestive heart failure was discussed in one session. The use and abuse of the ataractic drugs was the subject of another seminar. Pernicious anemia and its treatment were discussed in another seminar.

To contribute current clinical aspects to the discussion, for the past 2 years the resident in medicine of the University Hospital has attended all the seminars. Last year, through the office of Dr. Nathan E. Needle, president of the Maryland Academy of General Practice, two general practitioners were assigned to these seminars. These two busy physicians, Dr. Walter A. Anderson and Dr. Joseph S. Blum, willingly and enthusiastically accepted this assignment. They are introduced at each seminar to the students as representatives of the Maryland Academy of General Practice. These men are doing the job which most of our students hope to do. The students appear to be impressed by their presence. They have actively participated in the discussions. Their attitude has been friendly yet always critical, especially in the evaluation of new drug therapy. They speak out of their own current experience, and the students have been greatly benefited by their comments.

This has been a most gratifying experience for the students and the staff of the department of pharmacology. In addition, it has been profitable to the general practitioners, since they are kept abreast of current pharmacologic advance. The hours so spent are also accredited as postgraduate work by the Maryland Academy.

This most gratifying experience is recorded here so that others may establish this contact between the teaching of pharmacology, the residency program in medicine, and the general practitioner, which in this department has been a successful experiment.

John C. Krantz, Jr.
Department of Pharmacology
School of Medicine
University of Maryland
Baltimore, Md.

Book Reviews

For Future Doctors

Alan Gregg. University of Chicago Press, Chicago. 1957. 165 pp. with index.

In this delightful little book, Dr. Gregg has put together 11 of his previous talks and/or publications, covering the period 1943 through 1955. The topics covered, range far and wide but throughout is woven the perspicuity concerning things medical for which the author was so well known.

From his vantage point, Dr. Gregg enjoyed a unique view of medical education. He saw things in broad perspective and described, often in an eloquent way, what he saw. Throughout this book are strewn many typical Greggisms such as: "That's why we have the professions, maybe, so people can accept the persons to tell them what would be just outrageous and unbearable from anyone else . . . And they say that medical education is so expensive! It is unsatisfactory medical education that is expensive—and so expensive . . . Patients do not want, and do not need, to be attended at the bedside of disease by mere Quiz Kids—persons as miraculous mentally as they are immature in every other way. That is what I mean when I say there are plenty of M.D.'s in this world but not enough real doctors . . . Much professional writing is verbose and repetitious. It is awkward and tiresome. What time it can spare from being vague is devoted to being inaccurate . . . (Concerning complacency) your wise old ileum greets bran with peristaltic enthusiasm but milk and honey with atony and relative stasis . . . Now the drawbacks of provincialism are that it leads to intolerance, incredulity, indifference, ineptitude in human relations and intermittent claudication of the mind . . . so, with recklessness that makes sad contrast with my years, I have ventured to mention the handicaps of a graduate of a first class professional school—complacency, ingratitude and provincialism . . . (in defense of travel) in short, scholarship can, and I believe does, suffer from the analogue of beriberi—which is a bookish provincialism."

The title of this book is a little misleading. It is the reviewers opinion that many who have enjoyed the title of "doctor" for many years will thoroughly enjoy reading this book. But in addition, those who are about to become doctors, those who are giving thought to becoming doctors, and all who are in any way interested in the medical profession will likewise spend an enjoyable evening with this book. K. E. P.

"Pathology"

W. A. D. Anderson. Third Edition, The C. V. Mosby Company. St. Louis, 1957. Price $16.00. 1402 pp. with index.

The third edition of Anderson's textbook of pathology follows in principle and in arrangement of chapters the previous editions. Four new members have joined the list of contributors, while death eliminated three previous coworkers. The text, printed in smaller type, has been enlarged in scope and material while the text pertaining to subjects of primary importance for the beginning student of pathology appears condensed and more concise.

The number of illustrations has been increased by one color table on the cells of the anterior pituitary gland and 47 black and white illustrations. These illustrations are excellent and are quite characteristic of the lesions represented. The list of references pertaining to each chapter has been reviewed and brought up to date.

It is the reviewer's opinion that Anderson's "Pathology" represents not only a textbook for the medical student but also a permanent reference book which should serve him during his entire medical career. In its present shape the book is one of the most complete texts for this important medical speciality. E. von Haam, M.D., *Ohio State.*

Atlas of Neuropathology

Nathan Malamud, M.D., University of California Press, Berkeley and Los Angeles. 1957. pp. XI and 468. $20.00.

The avowed purpose of this volume is to provide a visual approach to neuropathology such as is not usually provided by textbooks of the subject. The author and publishers are to be congratulated upon achieving their purpose. There is a minimum of descriptive text which is arranged so that photographs of gross and microscopic material are readily available on the page facing the text. This affords an unusually convenient availability of illustration to corresponding description. Frequently, less than half the page is taken up with the descriptive text, making plenty of space available for the reader's own notes. The first two pages of illustrations, which demonstrate selected staining technics, are in color, the remainder in black and white. Reproduction of color for medical publication still leaves much to be desired. Black and white photomicrographs, when carefully selected, as are those in this atlas, serve a better purpose than to attempt more expensive and often inadequate color reproduction.

By the varying nature of this type of presentation, the descriptive text is didactic and dogmatic. Controversial points are occasionally mentioned but the reader is left uncomfortably stranded by the lack of references and by the inadequacies of the bibliography. Almost all of the text references are to papers written by the author. The index, on the other hand, is quite adequate.

The material is divided into ten chapters illustrating quite adequately the common neuropathological entities with sufficient illustrations of both gross and microscopic material, using, for the most part, illustrations of common stains so that he in a general pathology laboratory will immediately feel at home. In addition, there are illustrations of rare conditions which greatly enhance the value of the book. Of particular value are the illustrations of the developmental disorders and the sequelae of paranatal and postnatal disorders. With so much interesting material available in the latter category, it is unfortunate that more discussion of this rather controversial subject could not be included. The very brief summary of disease of the peripheral nerve is one of the weaker points of the atlas.

In general, the over-all picture is that of a succinct, didactic description of case material primarily, but case material that illustrates most of the important facets of neuropathology. The photographs of the gross and microscopic material not only are well selected and in general give adequate visualization of the disease process but in addition, are well reproduced. The book should be of great value to the general pathologist and the neurologist, and as an aid to the teacher of neuropathology. R. G. Berry, M.D. *Jefferson Medical College.*

Modern Operative Surgery

4th Edition, Two volumes. Edited by the late G. Grey Turner and Lambert Charles Rogers. Great Britain, 1957. Hoeber-Harper, Inc. pp. 2614 with index, ills. 1090.

This excellent comprehensive treatise of modern operative surgery as it is practiced in Great Britain should be of great interest to surgeons at home and throughout the world. It has been prepared by an illustrious group of British collaborators who represent many outstanding surgical centers.

The reviewer did not have access to the first of the two volumes which is apparently devoted to a discussion of general principles of surgery and to the management of problems which arise in the thorax, abdomen, and in the vascular and musculo-skeletal systems. Volume two opens with chapters describing the operations for hernia and for the surgical lesions of the rectum and anal canal. Other chapters are devoted to the neck and to the thyroid, parathyroid and thymus glands. There is a superb and enlightened discussion of the management of malignant lesions of the lips, jaws, mouth and tongue by the discriminate use of surgery or of radiation therapy and the indications for each therapeutic modality are clearly presented. A separate chapter is wisely devoted to a general discussion of Radiation Therapy in Malignant disease which provides supplementary knowledge of increasing importance to the surgeon.

The remainder of this volume describes those operations which fall into the specialized fields of otorhinolaryngology, ophthalmology, neurosurgery, gynecology, urology, plastic and max-

illofacial surgery. These chapters are comprehensive in scope but concise in presentation and will be particularly useful to those surgeons who do not limit their interests to those fields.

The book is liberally illustrated by well selected photographs, roentgenograms and excellent simplified drawings. Basic anatomical details are expertly correlated with the descriptions of many of the operative procedures.

The collaborators, quite understandably, draw predominately upon British surgical experience in writing to their subjects. American surgeons as a consequence may take exception to some of the concepts and opinions expressed throughout the pages of this book. These differences, authoritatively presented by such eminent surgeons, greatly enhance the importance of these volumes to us.

Mr. Turner, Mr. Rogers and their collaborators deserve high praise for their success in presenting a clear, interesting compendium of contemporary surgical practices. Marion S. De Weese, M.D. *Univ. of Michigan.*

The Textbook of Medicine

Sir John Conybeare, W. N. Mann. Livingston-Williams and Wilkins, 1957, 12th edition. 861 pp. with index.

This has been a standard textbook of medicine in the United Kingdom for a long time. With each edition there is an increasing number of contributors which is further proof of the inability of any one physician to discuss in an up-to-date comprehensive fashion a variety of subjects in the vast field of Internal Medicine. The traditional pattern of groups of diseases beginning with infections is followed. The last two sections are on psychological medicine and common diseases of the skin.

In reviewing this volume I have selected several subjects to review that I have been especially interested in. These may not be entirely representative but from the chapters that I reviewed I believe that some of the discussions are not up-to-date either in regard to the etiology and the pathogenesis of the several maladies nor the treatment recommended. As an example, it is recommended that the diet for patients with gout consist mainly of vegetables, bread, fresh fruit and cheese. During an acute attack, lead and opium lotion is to be applied. Salicylates are recommended as the safest uricosuric agent, although it is noted that Benemid sometimes is effective. In contrast, current thinking places little emphasis upon the dietary control, local applications are seldom used while Benemid is by all odds the most effective uricosuric agent available.

It is stated that systemic lupus erythematosis is relatively uncommon. Less than one page is devoted to this malady. In contrast seven pages are devoted to a discussion of diphtheria and four pages to a discussion of gonorrhea. The carcinoid syndrome is not mentioned. In the diagnosis of multiple myelomatosis emphasis is placed upon the discovery of Bence-Jones proteinuria but no mention is made of an anti-complimentary serologic reaction. In most series in the U.S. the incidence of Bence-Jones proteinuria is relatively low.

In other instances the discussion is thoroughly contemporary. A discussion of the treatment of rheumatoid arthritis is similar to that recommended in the latest pamphlet of the American Rheumatism Association. Although most likely this volume is a satisfactory textbook of medicine I doubt if many teachers in the United States will recommend it when several other American textbooks of medicine which are more comprehensive and more familiar are available. John H. Talbottt, M.D. *Univ. of Buffalo.*

Experimental Psychology and Other Essays

I. P. Pavlov. Philosophical Library, N. Y., 1957. 653 pp. with index.

This book is a collection of lectures of Pavlov selected and grouped under the following headings: Works on Blood Circulation and the Trophic Action of the Nervous System, Works on Digestion, Problem of the Study of Higher Nervous Activity and the Ways of its Experimental Solution, Methods of Investigation and Fundamental Laws of Development, Theory of Analyzers, Localization of Functions and Mechanism of Voluntary Movements, Theory of Types, Problems of Sleep and Hypnosis, Physiology and Psychology in the Study of Higher Nervous Activity, Experimental Pathology of the Higher Nervous Activity, Physiology and Psychiatry. The book includes the ideas of Pavlov which must be studied by all serious

students of physiology, psychology and psychiatry. The title of the book as it appears on the spine is somewhat misleading in that major portions are not concerned with experimental psychology. Pavlov himself probably would be surprised if he could see a collection of his lectures published under such a title since he did not identify himself with the field of psychology. In fact his view of contemporary psychologists was unflattering as indicated by the following: "It is my conviction that a purely physiological interpretation of much of what was previously called psychical activity has gained sure ground, and that in the analysis of the behaviour of higher animals, man included, every effort should be legitimately made to interpret phenomena in a purely physiological way, on the basis of established physiological processes. However, it is clear to me that many psychologists, so to speak, jealously protect the behaviour of animals and man from purely physiological explanations, constantly ignore them and do not try to apply any of them in an objective way." (p. 442).

In a 30 page introduction to the book Kh. S. Koshtoyants states that Pavlov's main lines of investigation can be traced to the works of Russian physiologists of the period from 1840 to 1870. The following statements in the introduction will be of interest to physiologists in England and the United States. "In this way Sherrington openly declared his negative attitude to the theory of conditioned reflexes, which to him, as a representative of idealistic philosophy, was unacceptable because it was a materialistic theory. Sherrington proclaimed that thought, emotions, etc. are not subjected to matter and to the concept of energy, that they are beyond it, and consequently beyond the confines of natural sciences." It is true that Pavlov was so astonished by some of the statements in Sherrington's "The Brain and Its Mechanism" that he could hardly believe he was translating correctly, and after being convinced that the translation was indeed accurate, Pavlov arrived at the following interpretation: "I simply suppose that he is ill, although he is only seventy years old, that these are distinct symptoms of old age, of senility."

Perhaps it is timely at present, when there is so much emphasis upon cellular physiology, to emphasize that the conditioned reflex is a phenomenon which could not be discovered except in a reasonably intact unanesthetized animal. Pavlov had no patience with cellular physiologists and felt that they were wasting their time. We now know, of course, that he was badly mistaken in this viewpoint, but we should not be guilty of completely discarding the Pavlovian approach.

Pavlov not only was extraordinarily effective as a researcher but also he had the faculty of arousing the interest of others in his studies so that he was able to attract strong support and obtain the best facilities for his laboratory. Pavlov's salesmanship also was apparent when he attempted to point out the practical applications of his discoveries. However, his lecture which covers applied aspects of the physiology of digestion, coming after a masterful series on mechanisms of control of secretion of digestive juices, must have been anticlimactic. In this regard, the inclusion of the first and last chapters of Pavlov's Lectures on the Work of the Principal Digestive Glands (the introduction and the applications in medicine, respectively) perhaps is appropriate in a book for the general reader, but these are the least meaty of the series.

The book admirably will serve the purpose of making available to English-speaking people the great contributions of Russia's best known physiologist, a man who after winning the Nobel prize for his work on the physiology of the digestive glands went on to write the first chapter in the experimental physiology of the higher nervous system. W. B. Youmans, M.D., *Univ. of Wisconsin.*

Review of "Clinical Laboratory Methods"

W. E. Bray. C. V. Mosby Co., St. Louis. 1957. 731 pp. with index. $9.75.

The usefulness of the well-received previous editions of this work is attested to by the number of dog-eared copies seen on the bookshelves of many hospital laboratories. The new (fifth) edition, the first since 1951, can be recommended as a wise purchase for the non-owner as well as for anyone whose 4th edition is worn, stained, and acid-spattered beyond reclamation. On the other hand, the owner of a well preserved copy of the 4th edition ought perhaps to make a careful comparison

before abandoning the older text, inasmuch as the significance and quality of the new material is somewhat uneven and is bound to have a varying appeal depending upon the needs and the knowingness of each prospective purchaser.

The format is different; it has been reduced to "pocket size," but is approximately 100 pages longer than its predecessor. The inclusion of new material is probably responsible for most of these additional pages because very little reduction in the number of words per page has been necessitated by the adoption of the new compact format. The bulk of the 1951 text is reproduced essentially unchanged; consequently, the new edition retains all the praiseworthy features which induced Dr. Benjamin B. Wells to conclude his extremely favorable review of the 4th edition with these words: "The book is highly recommended as a practical guide to laboratory diagnosis and as a teaching reference for clinical pathology and medical technology" (Am. J. Clin. Path. 21:994 (October) 1951). This pronouncement remains valid in 1957.

In his preface to the new edition, Dr. Bray lists more than twenty items as "additional material". Actually—as even a random comparison between the 4th and 5th editions will show—his enumeration is incomplete. This point is stressed because the hypercritical reader might find it difficult to justify the new edition solely on the basis of those topics to which Dr. Bray has directed his attention in the preface. For it is in these that the uneven quality of the additional material is most apparent; some seem irrelevant; some unimportant; and others, of great importance, seem to have been insufficiently developed even when allowance is made for the essentially synoptic nature of this type of text.

Thus, one of the longer addenda concerns "the status of the Salk vaccine" —a topic which seems strangely out of place in a manual concerned with clinical laboratory methods. The galactose tolerance test receives complete coverage in a one page addition; this now rarely used (although by no means discredited) procedure was omitted from the previous edition and no explanation is given for its current revival. The discussion on transaminase overlooks the availability of several accurate, easily performed procedures which can be carried out in the laboratory of the average small hospital.

The few omissions are not serious and, to a certain extent, their recognition reflects the personal prejudices of this reviewer. For example, Zak's procedure for determining cholesterol and Caraway's uric acid method seem ideally suited for inclusion in this type of manual. There is no explicit discussion of micro-methods. Blood ammonia is not mentioned; this is perhaps the most important and the least justifiable omission.

Clinical pathology is progressing rapidly and the need for new editions of the standard texts and manuals will increase. Fortunately, Dr. Bray's book is ideally suited for periodic revision and one can safely predict that the 5th edition will by no means be the last. M. V. MacKenzie, M.D., *Tufts University.*

The Doctor, His Patient and the Illness

Michael Balint, M.D. International Universities Press, 1957. 355 pp. with index. $7.50.

It would be a good idea if every physician could analyze his habits, customs, traits, strong and weak points along the lines of self-administered critique suggested in this book. Despite the formidable title, Balint's book turns out to be an extremely interesting analysis of the practice of medicine as it relates to the family doctor. Regardless of whether one supposes that the family doctor has disappeared as a general practitioner and will become a well-trained internist, whether he believes that the foundation of medical practice will continue to be a generalist, doing all things for all people, this book provides useful insights. It deals with the practice-of-medicine as a sick patient. It is presented as a series of intimate critiques held jointly by practitioners and psychiatrists under the auspices of the Tavistock Clinic discussing specific cases and specific forms of treatment in a series of seminars. General practitioners and psychiatrists confront the actual problems of real patients in medical practice, reviewing their failures and successes in an attempt to get a clearer understanding of what medicine is all about. Much of the book consists of annotations and

case notes with discussions of and about patients whose histories are abstracted. We might doubt that in this country, in any event, most patients want to know the name of their illness, the diagnosis before they want therapy for suffering or for symptoms. Perhaps British patients are more stoical or more sophisticated than their American counterparts. But such is certainly rare in my experience. There is remarkably little of the intrusion of interpretation along psychoanalytic lines into the free and interesting discussions recorded in this book.

Some of the things considered are what the patient offers to the doctor and the doctor's responses; elimination of inappropriate diagnoses by the physical examination, the incidence and evaluation of neurotic symptoms; the various levels of diagnosis; the collusion of anonymity among doctors, general practitioner and consultant; and the perpetuation of the teacher-pupil relationship. In the realm of psychotherapy, topics considered are advice and reassurance, how to start, when to stop, the special psychological atmosphere of general practice, and general-practitioner-as-psychotherapist. One notices occasionally the general practitioner's resistance to the advice and formulations of psychiatrists though with more discussion and clearer insight, fair compromises are reached in many areas well off the beaten path from ordinary general practice. This is an extremely thoughtful book which represents a great advance in doctrine and practice and points hopefully to the closer rapprochement between physicians and psychiatrists. It is very refreshing to find an admission of ignorance and a need for research. It would help achieve an enormous assistance patients and physicians alike can receive from psychiatrists if more of them would relax their defensive posture and adopt this attitude of the inquiring mind. William B. Bean, M.D. *Iowa State University.*

ABSTRACTS

Zinsser Bacteriology

David T. Smith and Norman F. Conant. Appleton-Century-Crofts, Inc., N. Y. 11th Edition, 1957. 919 pages, 433 illustrations.

The first edition of this widely used textbook was written in 1910. The first eight editions were under the guidance of Drs. Hiss, Zinsser and Bayne-Jones. The last three editions have been by the present authors. As in previous editions, an attempt has been made to emphasize the basic biologic approach to bacteriology and, at the same time, to emphasize the public health significance and the practical clinical importance of certain of the biologic characteristics of the organisms. Much of the material has been re-written or revised and the areas of more rapid development, i.e., bacterial physiology, immunology, and the viruses, have received special attention. A new chapter on blood groups and immunohematology has been added. A total of 121 new illustrations have been added to this edition.

Biochemistry

Abraham Cantarow and Bernard Schepartz. W. B. Saunders Company, Philadelphia. 2nd Edition, 1957. 786 pages.

This textbook is aimed primarily for the first year medical student; however, its usefulness does not end there. The first edition of this book, published in 1954, met widespread acceptance along a variety of readers. The 2nd edition is primarily for the purpose of bringing the material up to date in this rapidly moving field. Some new material has been added and new forms of presentation of the old material have been substituted.

Essentials of Human Anatomy

Russell T. Woodburne. Oxford University Press, New York. 1st Edition, 1957. 601 pages with 403 illustrations.

This text is written primarily for the beginning medical student. It presents the basic concepts of the systems of the body and then examines the body in detail, regionally. Within each region, the order of presentation is from superficial to deep. The continuity of parts is repeatedly stressed by numerous cross references and by illustrations designed to be synoptic as far as possible. This is not an elementary text. Its brevity comes from an adherence to the essentials of morphology presented functionally and concisely. Only the most frequent variations are discussed, more concerning the vascular system than other systems. The newly adopted revised anatomical nomenclature is used throughout.

Functional Neuro-Anatomy

A. R. Buchanan. Lea and Febiger, Philadelphia. 3rd Edition, 1957. 359 pages, 273 illustrations, plus 76 pages of an Atlas of Brain Stem.

An effort has been made to continue the policy of providing a basic textbook of essential material covering neuro-anatomy in the least possible number of pages. Some changes have been made in sequence in this edition, the most notable being the placing of a chapter on the basal ganglia ahead of that on the hypothalamus. Many changes have been made in the figures. The objective of the third edition, as of the preceding edition, has been to coordinate the anatomy of the nervous system with its overall functions insofar as possible and in as logical a sequence as practicable.

Treves' Surgical Applied Anatomy

Revised by **Lambert Charles Rogers.** Lea and Febiger, Philadelphia. 13th Edition, 1957. 553 pages.

This is now the oldest textbook of surgical anatomy written in English to remain in current use, having been first produced by Dr. Treves in 1883. While the author has made a concerted effort to bring the present edition in line with the newer practices of surgery, he has endeavored to retain the qualities originally given the book by Dr. Treves. This book is intended mainly for the use of students but likewise it is a reference for "practitioners whose memory of their dissecting room work is growing a little gray, and who would wish to recall such anatomical matters as have the most direct bearings on the details of practice."

Surgical Technique, and Principles of Operative Surgery

A. V. Partipilo and eighteen other contributors. Lea and Febiger, Philadelphia. 6th Edition, 1957. 951 pages, 719 figures containing 1235 illustrations.

In this text an endeavor has been made to include in each chapter a review of surgical anatomy and a discussion of pertinent pathological, physiological and clinical aspects of each subject. Complete chapters are devoted to consideration of the physiological basis for the treatment of many disorders. Effort has been made to emphasize the importance of diagnosis, indications for the operation, and the pre-operative and post-operative treatment of the patient. In this edition 38 new chapters have been added. These are in the areas of anesthesiology, the use of radio-isotopes, advances in cardiac and blood vessel surgery, thoracic surgery, surgery of the breast and neck. All other chapters have been completely revised and brought up to date.

Operative Obstetrics

R. Gordon Douglas and **William B. Stroumse.** Appleton-Century-Crofts, Inc., N. Y. 1st Edition ,1957. 717 pages.

This book is conceived as a companion to Williams Obstetrics. The objective has been to confine this work to operative obstetric practice. In addition, related surgical conditions occurring during pregnancy and the puerperium have been discussed. The major obstetric operations have been dually presented in the written text and the illustrations. Anatomy, anesthesia, and resuscitation of the new-born, important components of a book on operative obstetrics, are presented in separate chapters. Much emphasis has been placed on pre-operative and post-operative care. The authors' objective has been to produce a volume which will serve a useful purpose for medical students, residents, general practitioners, and specialists in this field.

Craig and Faust's Clinical Parasitology

Ernest C. Faust and **Paul F. Russell.** Lea and Febiger, Philadelphia. 6th Edition, 1957. 1008 pages, 346 illustrations.

This edition represents a thorough revision. Several chapters have been completely rewritten and information in many of the others has been condensed without sacrificing essential data, to accommodate new information without materially increasing the size of the textbook.

Obstetric Mechanics and Their Management

John C. Ullery and **Mario A. Castallo. F. A.** Davis Company, Philadelphia. 1st Edition, 1957. 389 pages, 185 illustrations.

This teaching manual is a direct descendent of "The Mechanics of Obstetrics" by Mario A. Castallo and Norris W. Vaux, much of the material and illustrations being from this source. The management of normal and of abnormal labors is particularly emphasized in this text. New material on the anatomy of the female pelvis as concerns labor, obstetric roentgenology, uses of and types

of forceps, etc., has been added. Also two new chapters, "Maternal Mortality" and "Paranatal Mortality" in relation to obstetric mechanism are included to show the student and obstetrician their important relationship to labor and delivery. Also included is a schedule of two-hour demonstrations wherein the student is assigned topics, and manikins are used under the instructor's guidance. Thus each student must demonstrate and show the various mechanisms as they occur in his patients.

An Atlas of Human Histology

Mariano S. H. DiFiore. Lea and Febiger, Philadelphia. 1st Edition, 1957. 215 pages, 156 figures.

This atlas is conceived as an aid to the student receiving initial instruction in histology. The illustrations are designed as composite drawings of what may be seen by the student only after a study of several slides. This is done for the pure didactic purpose of reducing the number of illustrations necessary for study, and to curtail the cost of publication. The illustrations are designed to cover the principles of histology clearly and concisely. They are not intended to present the student with a bewildering array of every last item known to the professional histologist. This book is not intended to supplant a textbook of histology but rather to serve as a supplementary text.

Pharmaceutical Calculations

Willis T. Bradley, Carroll B. Gustafson and Mitchell J. Stokkeen. Lea and Febiger, Philadelphia, 3rd Edition, 1957. 226 pages.

In addition to the 226 pages in text, this book is made up of 10 appendices covering 50 pages and 287 practice problems in pharmaceutical calculations. This textbook is concerned exclusively with the arithmetic of applied pharmacy. It has been made to conform with the usage of the current revision of the *United States Pharmacopeia*. The 3rd edition presents no radical changes in the previous editions of this book. Theoretical discussion is cut to a minimum and is included only to contribute to understanding of the problem and its solution.

BOOKS RECEIVED

Hormones in Blood: Ciba Foundation Colloquia on Endocrinology, Volume XI. Edited by G. E. W. Wolstenholme and Elaine C. P. Millar. Price, $9.00, 416 pp. with index.

The Dissociation of a Personality: Edited by Morton Prince, M.D., LL.D. Published by Longmans, Green and Co., Inc., New York. Price, $5.00, 575 pp. with index.

Manual of Pharmaceutical Law: Edited by William Pettit, lecturer in Pharmaceutical Jurisprudence, University of Pittsburgh. Published by The MacMillan Company, New York. Price, $4.50, 303 pp. with index.

Deafness, Mutism and Mental Deficiency in Children: Edited by Louis Minski, M.D., F.R.C.P., D.P.M. Publishd by the Philosophical Library, New York. Price, $3.75, 83 pp. with index.

Manual of Pediatric Physical Diagnosis: Edited by Lewis A. Barness, M.D., associate professor of pediatrics, University of Pennsylvania School of Medicine. Published by The Year Book Publishers, Chicago. Price, $4.00, 195 pp. with index.

Healthful School Living: A Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association with the cooperation of contributors and consultants. Edited by Charles C. Wilson, M. D., professor of education and public health, Yale University. 323 pp. with index.

Allergy in Pediatric Practice: Edited by William B. Sherman, M.D., associate clinical professor of medicine, Columbia University College of Physicians and Surgeons; and Walter R. Kessler, M.D., Ph.D., instructor in pediatrics, Columbia University College of Physicians and Surgeons. Published by The C. V. Mosby Company, St. Louis. Price, $9.25, 296 pp. with index and illustrations.

Clinical Electrocardiography (The Spatial Vector Approach): Edited by Robert P. Grant, M.D. Published by McGraw-Hill Book Company, Inc., New York. Price, $7.50, 225 pp. with index.

Practical Use of the Office Laboratory and X-Ray: Edited by Paul Williamson, M.D. Published by The C. V. Mosby Co. Price, $10.75, 323 pp. with index.

Atomic Energy in Medicine: Edited by K. E. Halnan. Published by the Philosophical Library, New York. Price, $6.00, 137 pp. with index.

Medical Radiation Biology: Edited by Friedrich Ellinger, M.D., chief radiation biologist and head pharmacology division, Naval Medical Research Institute; member Radioisotope Board and consultant to the Tumor Board, U. S. Naval Hospital, Bethesda, Md. Published by Charles C. Thomas, Springfield, Ill. Price, $20.00, 945 pp. with index.

Shock and Circulatory Homeostasis: Transactions of the Fifth Conference, November 30, December 1, and 2, 1955. Edited by Harold D. Green, M.D. Published by The Josiah Macy, Jr. Fdn. Price, $4.75, 337 pp. with index.

Cardiovascular Rehabilitation: Edited by Paul Dudley White, M.D., Howard A. Rusk, M.D., Bryan Williams, M.D., and Philip R. Lee, M.D. Published by McGraw-Hill Book Co., Inc. Price, $6.50, 155 pp. with index.

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1958

By Charles O. Wilson, Ph.D., Professor of Pharmaceutical Chemistry, College of Pharmacy University of Texas and Tony Everett Jones, Ph.D., Assistant Professor of Pharmaceutical Chemistry, College of Pharmacy University of Colorado.

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Items of Current Interest

Educational Council for Foreign Medical Graduates

After almost 3 years of planning, the Educational Council for Foreign Medical Graduates opened its doors on October 1, 1957, at 1710 Orrington Avenue, Evanston, Illinois.

What functions will it serve?—It will distribute to foreign medical graduates around the world authentic information regarding the opportunities, difficulties and pitfalls involved in coming to the U. S. on an exchange visitor or exchange student visa in order to take training as an intern or resident in a U. S. hospital, or coming on an immigrant visa with the hope of becoming licensed to practice.

It will make available to properly qualified foreign medical graduates while still in their own country a means of obtaining ECFMG certification *(a)* to the effect that their educational credentials have been checked and found meeting minimal standards (18 years of formal education, including at least 4 years in a bona fide medical school), *(b)* that the command of English has been tested and found adequate for assuming an internship in an American hospital, *(c)* that the general knowledge of medicine as evidenced by passing of the American Medical Qualification Examination is adequate for assuming an internship in an American hospital.

It will provide hospitals, state licensing boards, and specialty boards which the foreign medical graduate designates, the results of the three-way screening available.

What functions will it not serve?—It will not serve as a placement agency either for interns or residents. Placement arrangements must be made by the foreign medical graduate directly with the hospital of his choice.

It will not attempt to evaluate the teaching program or inspect or approve any foreign medical school. Its program is based not upon evaluating the school from which the candidate graduated but upon evaluating the professional competence of the individual.

It will not act as an intercessor for foreign medical graduates having problems under discussion by state boards of medical licensure or specialty boards. If the foreign medical graduate asks that the results of his three-way screening be sent to a designated board this will be done, but the ECFMG has no right and no desire to review the decisions of the properly constituted state licensing boards and American specialty boards.

Who is sponsoring the ECFMG?—Sponsors of the new agency are the American Hospital Association, the American Medical Association, the Association of American Medical Colleges and the Federation of State Medical Boards of the United States. Providing funds to support it through the first 2 years of its existence are the sponsoring agencies and the Kellogg Foundation, and the Rockefeller Foundation.

The ECFMG has been legally incorporated in the State of Illinois and is operating in the first year of its provisional approval as a tax exempt organization under Section 501 (c) (3) of the *Internal Revenue Code of 1954*. The ten-member Board of Trustees includes two representatives from each of the four sponsoring agencies and two representing the public at large (one named by the

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Department of Defense, the other by the Department of Health, Education and Welfare). The President of the Board of Trustees is Dr. J. Murray Kinsman, Dean of the University of Louisville School of Medicine. The Executive Director is Dr. Dean F. Smiley, former Secretary of the Association of American Medical Colleges.

What are the mechanics of the examination?—The ECFMG's Examination Committee will select the items for two examinations a year from the National Board of Medical Examiners' pool of questions. The National Board of Medical Examiners will use as many of its 50 presently constituted U. S. examination centers as will be required and will establish examination centers abroad in numbers as found required to meet the need.

The National Board of Medical Examiners will proctor the examination, score and analyze the results, and turn them over to the ECFMG's Examination Committee for final evaluation and action.

What is the charge to be?—Foreign medical graduates already in this country will be billed for $50.00 covering the cost of the three-way screening. This will include $15.00 for the evaluation of credentials and $35.00 for the American Medical Qualification Examination.

Foreign medical graduates abroad will be billed the $50.00 only if and when they pass the screening, receive a position in an American hospital or are otherwise earning American dollars.

American hospitals receiving screened candidates will be billed $75.00 for each such candidate accepted.

What are the target dates for various services?—The answering of correspondence began October 5th and has been kept current since that time. The translation, interpretations, and evaluation of credentials has already begun.

The target date for the first American Medical Qualification Examination for foreign medical graduates already in this country is set for March 25, 1958.

The target date for the second American Medical Qualification Examination for foreign medical graduates both here and abroad is set for September 23, 1958.

Mend News

On January 1, 1958, ten colleges of medicine officially began their MEND affiliation. They were: Albert Einstein, Bowman Gray, Columbia, Howard, Iowa, Miami, Northwestern, Oklahoma, Rochester, and Virginia. A meeting of the coordinators of these schools has been scheduled for Chicago on February 8. This raises the level of schools officially participating in MEND to forty-five.

In addition to the Army-sponsored symposium on "Management of Mass Casualties" on March 3-5 at the Walter Reed Army Institute of Research, a second MEND symposium is being planned for the spring. Sponsored by the Public Health Service, this program will be conducted on May 12-14 in Ann Arbor and Detroit, Michigan, and will deal with "Medical Aspects of Highway Safety." Present planning indicates that two spaces for participants will be allocated to each MEND-affiliated medical college, plus one space each to non-MEND schools.

National Academy of Sciences

The Division of Medical Sciences of the National Academy of Sciences, National Research Council, is accepting applications for grants-in-aid of research for consideration by the Committee for Research in Problems of Sex. The funds for support of this program are provided by the Rockefeller Foundation and the Ford Foundation.

Public Health Service

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Reference: 1. J.A.M.A. 158:386 (June 4) 1955.

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10,096 grants totaling $145,765,544 for outside research, training, and construction during the last fiscal year, a report issued by the Service has disclosed.

Over half of the money—$80,906,075—went for support of 6,186 research projects concerned with major diseases and various basic problems in the medical and biological sciences. These grants were made to 572 institutions in 48 States, the District of Columbia, two Territories and 23 foreign countries.

Grants to help build or expand 109 research facilities, totaling $29,999,905, were awarded on a matching basis to 68 institutions in 30 States and the District of Columbia.

Research fellowships totaling $5,416,470 were awarded to 2,153 investigators in 202 institutions. These are located in 43 States, the District of Columbia, one Teritory, and eleven foreign countries.

Also awarded during the year were 114 grants for field investigations of cancer, totaling $1,972,208; 1,119 research training grants, totaling $25,629,179; and 415 traineeships, totaling $1,841,707.

Research grants totaling $27,013,630 were awarded during the month of November, 1957, by the National Institute of Health.

Non-Federal scientists and institutions throughout the Nation received a total of 1,589 grants to support research in medical and related sciences.

Of the 1,589 grants, 155 totaling $4,955,382 have been awarded for new projects. The remaining grants represent continuations or supplements.

The grants support research projects in 310 institutions—medical schools, universities, hospitals, and other research centers—in 45 states, the District of Columbia, two territories, and fourteen foreign countries.

A new program to increase the number of trained scientists for research and academic careers in fields of basic importance to health has also been announced by the Public Health Service.

Designed to provide aid for graduate level training in medical schools, universities, and other qualified training institutions, the new program is to be financed through the Service's National Institutes of Health and will be known as the "General Research Training Grants Program."

Institutions receiving funds under the new program will select and appoint individuals for predoctoral and postdoctoral training. The institutions will determine stipends to be paid. They are not restricted to a set pattern in developing training, but may propose programs of any nature which reflect research training needs as seen by the institutions and which provide the best utilization of their facilities.

The "General Research Training Grants Program" will be administered by the Division of Research Grants of the National Institutes of Health. Institutions wishing further information, including application forms and instructions, may obtain them by writing to the Chief, Re-Research Grants, National Institutes of Health, Bethesda 14, Maryland.

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News from the Medical Schools

Albany

Albany Medical College dedicated its Eldridge H. Campbell Memorial Surgical Research Laboratory in ceremonies held recently. Dr. Frank B. Berry, assistant secretary of defense (health and medical), delivered the dedicatory address.

The laboratory is named in honor of the late Dr. Eldridge H. Campbell, who was chairman of the department of surgery and professor of neurosurgery at the college. At the time of his death in February, 1956, Dr. Campbell was chairman of the American Board of Neurological Surgery. The laboratory was built largely through his efforts.

Baylor

The French Academy of Sciences has named Dr. ROGER GUILLEMIN, associate professor of physiology, as the winner of the 1957 prize for physiology (Prize Louis Bonneau). Cited for his recent work on the physiology of the hypothalamo-pituitary relationships, he is the first person living outside of France to win the medal and stipend of $800.

U. of Chicago

Dr. ROBERT G. PAGE, assistant professor in the department of medicine of the division of biological sciences, has been appointed assistant dean of the division in charge of medical curriculum. This is a new position in school administration.

Cincinnati

Dr. CHARLES E. RAVEN, personal chaplain to Queen Elizabeth of England and recent vice-chancellor of Cambridge University, has accepted an appointment as the University of Cincinnati College of Medicine's first visiting professor of the philosophy of science.

The British scientist and theologian will arrive in Cincinnati in March. He will present a series of public lectures on the contributions of medicine to the philosophy of science.

Columbia

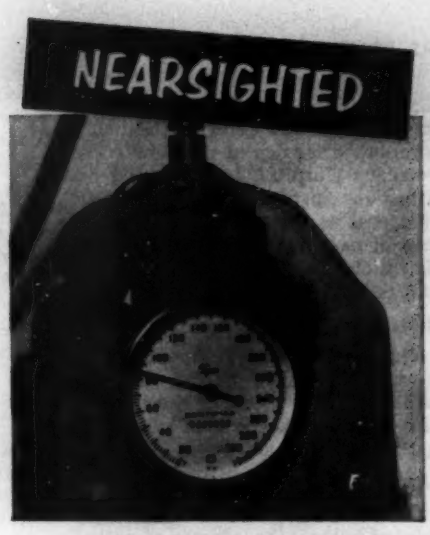
Dr. WILLIAM H. SEBRELL, JR., has recently been appointed director of the Institute of Nutrition Sciences and professor of public health nutrition.

The appointment of Dr. Sebrell, formerly director of the National Institutes of Health and former assistant surgeon general of the United States Public Health Service, marks a major step in the establishment of the Institute of Nutrition Sciences and furthers the development of the Educational and Research Program in Columbia's School of Public Health and Administrative Medicine at the Columbia-Presbyterian Medical Center.

Cornell

Dr. ROBERT F. PITTS, professor of physiology and chairman of the department, will be on leave from January 14 to February 23, 1958, to participate in an educational program sponsored by the Unitarian Service Committee. His schedule includes visits to Rome, Istanbul, Ankara, Beirut, Jerusalem, Tel Aviv, and Haifa. In each of these places he will lecture and hold conferences on the subject of Renal Function, Electrolyte and Water Metabolism.

The Public Health Service has recently awarded the medical college a matching grant of $1,500,000 for the construction of additional facilities for research.



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Duke

The university has received a $238,000 grant from the Rockefeller Foundation to support a new graduate study program in nursing.

The grant will supplement more than $200,000 in Duke University funds allotted for the program. Purpose of the program is to help nurses meet the increased responsibilities created by advances in medical and surgical care. Offering the Master of Science in Nursing degree after 12 months' study, the program centers around development of advanced nursing skills to better equip nurses for specialized responsibilities in hospital bedside nursing, for supervisory positions, and for teaching.

Harvard

Dr. BENJAMIN C. FERRIS will become associate professor of environmental health and safety at the Harvard School of Public Health and director of environmental health and safety for the University Health Services. Both posts, which Dr. Ferris will assume on July 1, 1958, are new within the university.

Since 1953, Dr. Ferris has been assistant professor of physiology in the Harvard School of Public Health.

A $2,500,000 remodeling program, involving two wings of one of the principal buildings at the Harvard Medical School, is now underway. When completed in January, 1959, the renovated area will house the research activities of the departments of anatomy and pharmacology.

Jefferson

The Jefferson Medical College and Hospital has recently announced the opening of a new Psychiatric Unit within the framework of the general hospital.

The new unit accommodates 25 beds and has every facility for the treatment of selected acute psychiatric cases.

Maryland

Dr. EUGENE B. BRODY, formerly associate clinical professor of psychiatry at Yale and chief of the neuropsychiatric service of the New Haven Veterans Hospital, has assumed new duties as professor of psychiatry. This creates a second full professorship in psychiatry in the department of which Dr. JACOB E. FINESINGER continues as chairman.

Meharry

The Commonwealth Fund has made a grant of $6,000 to the school of medicine for a study of the possibilities for the expansion of psychiatric instruction at Meharry.

North Dakota

Dr. JOHN H. LUNSETH has been appointed assistant professor of pathology, effective January 1, 1958. Dr. Lunseth has been director of the laboratories in the department of pathology at the Milwaukee County Hospital and assistant professor of pathology at Marquette University since 1954.

Dr. EDWIN G. OLMSTEAD has been appointed assistant professor of medicine as of January 1, 1958. Dr. Olmstead has been assistant professor of medicine at Marquette University and assistant medical director at the Milwaukee County Hospital since 1952.

Rochester

In recognition of his scientific achievements and promotion of science, Dr. WILLIAM S. MCCANN, emeritus Dewey Professor of Medicine, has been elected a fellow of the New York Academy of Science.

St. Louis

Dr. ELIJAH ADAMS, associate professor of pharmacology of the New York University College of Medicine, has been appointed professor of pharmacology and director of the department. Dr. Adams' appointment will become effective September 1, 1958.

S. U. N. Y. Brooklyn

Dr. HOWARD W. POTTER will retire

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as professor and chairman of the department of psychiatry at the Downstate Medical Center in Brooklyn on December 31, at the age of 65.

A member of the faculty for 20 years, Dr. Potter has been chairman of the department of psychiatry since 1947. In addition, he served as acting dean of the College of Medicine from September, 1954, to June, 1955, and as dean from June, 1955, to September, 1957. He has also been director of psychiatry at the Kings County Hospital Center since 1947.

Dr. Potter has accepted an appointment as visiting professor of psychiatry at the University of the Philippines College of Medicine, and, upon his retirement from State University, will act as a consultant to the dean there in organizing and developing a modern program of psychiatric education.

Vermont

Recently, ground was broken for the new College of Medicine building at the University of Vermont. The structure, which represents Phase I in a major expansion program, will include laboratory and clinical research facilities. It will adjoin the Mary Fletcher Hospital.

The Hon. George D. Akien, U. S. Senator from Vermont, President Carl W. Borgman, and Dean George A. Wolf, Jr., were among those taking part in the ceremony.

Washington

A gift of approximately $100,000, to be used toward construction of a building for a heart and cancer research laboratory was accepted in December by the Board of Regents from Dr. and Mrs. S. Maimon Samuels.

Dr. Samuels, a Seattle physician since 1909, has informed the Board that he plans to add to this original gift in the future.

This money, together with other funds that may be obtained, will be used to construct the building, which will be part of the division of health sciences. The Regents announced the structure will be named "The Dr. S. Maimon Samuels Institute for Health and Cancer Research.

Yale

Dr. NELSON KNEELAND ORDWAY has been appointed professor of pediatrics, effective January 1, 1958. He has been professor of pediatrics at the University of North Carolina School of Medicine since 1954.

He fought an unheralded battle— as important as any in our era

Adventures in Medical Education

BY G. CANBY ROBINSON

DR. Robinson's long, event-studded career spans the first six decades of the 20th century. He is the dedicated man who was instrumental in the fight to bring American medical education out of the "dark ages" at the turn of the century and who played a major part in what is already known as "the heroic age" of American medicine.

WHEN Canby Robinson graduated from the Johns Hopkins Medical School in 1903, that school with Drs. Welch and Osler on its faculty was a phenomenon, a nonpareil, on the American scene. And when young Dr. Robinson, imbued with the ideals of the Hopkins, decided to find a career in the almost non-existent field of academic medicine, he was heading, not for a quiet life, but for the arena where great battles were to be fought. His adventures are set down in this absorbing chronicle.

Medical education and training sank to a disgracefully low level in this country during the 19th century, and the "dark era," as the author describes it, continued on well into our own century. Between 1900 and 1910, roughly, a medical revolution began of a violence and importance that were almost equally unknown to the general public whose care and well-being were at issue.

AT the time Dr. Robinson's narrative begins, the overwhelming majority of doctors in this country received their medical education in proprietary schools. It is merely necessary to point out that the income of these schools derived either wholly or in large part from tuition fees in order to glimpse the ocean of evils in which education was drowning. The system led to multiplication of schools, competition of students, virtual abandonment of admission or achievement standards, inferior teachers, and short courses of lectures only. Students had little or no opportunity for research training, laboratory or clinical work, or for acquiring experience in a hospital and with patients.

In general this was the situation when, in 1908, Abraham Flexner was asked by the Carnegie Foundation to make a study of American medical schools. He did so, using Johns Hopkins as a standard of comparison, and his report, published in 1910, began a chain reaction whose repercussions are still being felt. The simplest and most immediate effect of the report was to mark and recommend for extinction 120 of the 155 medical schools then in existence in the United States and Canada.

AMONG these stormy and exciting events Canby Robinson entered on his first major appointment in academic medicine as a member of the staff of the recently created Rockefeller Institute Hospital. From then on he was to play a part of ever increasing importance in the great movement to raise the standards of medical education to the university level and win acceptance for the idea, among many others, that research into the causes of disease must go hand in hand with its treatment.

IN 1913 at a time when there was no first class medical school "west of the Blue Ridge Mountains" Dr. Robinson moved to St. Louis as associate professor of medicine to join the epoch-making establishment of the reorganized Washington University Medical School. When that achievement was both history and a going concern in 1920 he went to Nashville to direct, according to his own now tested ideas, the reorganization of what became the fine Vanderbilt University Medical School. And then in 1928, on the eve of the great depression that changed the cut of so many pieces of cloth, he returned to New York to undertake the colossal task of being director of the newly formed New York Hospital-Cornell Medical College Association, an organization which is now, after countless difficulties, spiritually and physically at home in its magnificent plant on the East River.

Canby Robinson moved on from New York in the '30's to China and back again to the United States where, at Johns Hopkins once more, he was one of the pioneers in the study of social and emotional factors in illness. Through the span of turbulent and creative years, the career of this much loved and admired physician has been at the leading edge of progress in American medicine.

In Canby Robinson's account of his own life he presents an accurate and engrossing picture of an historic period in the annals of medicine. Many great men emerge in these pages and above all Dr. Robinson conveys clearly the sense of companionship in a great purpose.

Adventures in Medical Education has just been published for the COMMONWEALTH FUND by HARVARD UNIVERSITY PRESS. It is available at $5.00 through your booksellers.

The Personnel Exchange

Faculty Vacancies

• WANTED: ASCP Registered Medical Technologist with Master's Degree to direct Curriculum of Medical Technology, Department of Pathology, Marquette University School of Medicine. Position is chiefly administrative and teaching. Salary open. Reply: Dr. J. F. Kuzma, Director of Department of Pathology.

• SURGEON: To head university service in veterans hospital, directing residency program and teaching in medical school. Extensive research facilities available in both veterans hospital and school. Full-time candidate preferred. Address: C. R. Hanlon, M.D., Director, Department of Surgery, Saint Louis University School of Medicine, 1325 S. Grand Blvd., Saint Louis 4, Missouri.

• UNIVERSITY OF CAPE TOWN, SOUTH AFRICA: Senior lecturer in physiology. Will teach medical and science students, and be responsible for experimental laboratories. Salary £1980 per annum plus temporary cost of living allowance for a married man (at present £234 per annum). Two copies of application should be sent to Secretary, Association of Universities of the British Commonwealth, 36, Gordon Square, London, W.C.1. A third copy should be sent Air Mail to the Registrar, University of Cape Town, Private Bag, Randebosch, South Africa.

• BASIC SCIENCE Ph.D.'s: wanted for expansion of Ophthalmology Department at Ohio State University. Special interest in young men with biochemical, biophysical or physiologic backgrounds. William H. Havener, M.D., Acting Chairman.

• PHYSIOLOGIST: To work in Surgical Research Department. Rank, salary, and possible dual appointment depend on qualifications. Primary responsibilities: Gastrointestinal problems and intravenous fat emulsions. Opportunity for own development. Isotope experience desired. Address: Department of Surgery, Louisiana State University School of Medicine, New Orleans, La.

• PUBLIC HEALTH ENGINEER: $6,000-$8,000. Health Educator; $4,000-$6,000. Liberal expense allowances, excellent working conditions, reply stating education and experience to: Buncombe County Health Department, P. O. Box 7328, Asheville, N. C.

• INSTRUCTOR IN ANESTHESIOLOGY: Position will be available after April 1 1958 at University of Miami School of Medicine. Write J. Gerard Converse, M.D., professor in anesthesiology, University of Miami School of Medicine at Jackson Memorial Hospital, Miami 36, Fla.

• INSTRUCTOR IN PHYSIOLOGY: Full-time staff. Position available July 1, 1958 in department of physiology at state-supported medical school. *Requirements:* Ph.D. or M.D. Experience and interest in teaching at the medical school level. Training, capability and interest in independently conducted cardiovascular research. *Duties:* Lecture and laboratory presentation of physiology to medical students and nurses. Establish and develop program of research in cardiovascular physiology. Salary: approx. $6500. Approximately half-time available for research. John M. Brookhart, Dept. of Physiology, Univ. of Oregon Medical School, Portland 1, Oregon.

• UNIVERSITY OF BRITISH COLUMBIA, Vancouver 8, B. C., Canada requires a full-time staff member in preventive medicine in the faculty of medicine. Applicants should be graduates in medicine with interest in epidemiological investigation. Salary and academic rank commensurate with training and experience. Address inquiries to: Dr. James M. Mather, Professor of Public Health.

• CLINIC DIRECTOR: Clinic Director to January 1960. Administrative and teaching post, while present director on leave of absence. Internal medicine background preferred but not essential. Address: J. P. Tollman, M.D., Dean, University of Nebraska College of Medicine, Omaha, Nebr.

• BIOCHEMIST: Ph.D. To take part in research projects on the biochemistry and physiology of the myocardium, with time available for independent work. In pathology department, with university appointment if qualified. Salary $6-8000 a year. Address: V-84.

• ANATOMIST: Full-time position in midwestern medical school; teaching and research. Rank and salary dependent upon experience and qualifications but Ph.D. or M.D. degree minimal. Address: V-85.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

• OBSTETRICIAN-GYNECOLOGIST: Age 38, Full-time teaching experience in U. S. and abroad. Currently instructor at medical school; seeks relocation and advancement. Available beginning 1958. Address: A-303.

• REGISTERED NURSE, JOURNALISM TRAINING: Seeks medical writing position. Medical secretarial, laboratory experience. Publications. Address: A-304.

• PHYSICIAN: Australian, 35, international postgraduate training (Australia, Britain, U.S.A.) basic sciences (pathology, physiology) and clinical medicine (pulmonary and heart disease) publications, society memberships, teaching experience. Main interest cardio-pulmonary disease. Wants faculty appointment U.S.A. Available as soon as immigration formalities completed. Address: A-305.

• CARDIOLOGIST-INTERNIST: Board certified 1951, Fellow A.C.P. 1953. Sub-specialty board in Cardiovascular Diseases eligible, for at present am completing a two years training program in same. This has included research, teaching, hypertension and renal diseases; cardiac catheterization, clinical cardiology and electrocardiography. Desire career in academic medicine including teaching, investigation and clinical practice as a full-time appointment. Available July 1958. Address: A-306.

• ANATOMIST: Ph.D., age 32, married. Desires teaching and research position with opportunity to complete studies for M.D. degree. Available June, 1958. Address: A-307.

• PROFESSOR OF PHARMACOLOGY: M.D., Ph.D., age 69, active in teaching and research after mandatory retirement from medical school, at present at a Mid-Western osteopathic college, would like teaching and/or research position. Presently pursued research opens new approach to the problem of *diet in heart disease*, by investigating the direct conversion of chemical into electrical in the tissues, in a novel manner. This work is supported by research grants from the National Heart Institute and the American Heart Association totaling $14,300 annually, and endorsed by the highest medical authorities. Detailed information will be given on request. Address: A-308.

• DIPLOMATE AMERICAN BOARD OF OTOLARYNGOLOGY: Age 32. Completed 4 year residency in midwestern medical center. Teaching experience at undergraduate and postgraduate levels. Numerous publications. Desires part-time or geographical full time position in medical school located in less populated area with opportunities for experimental and clinical research. References available from chairman of department and dean of medical school. Available July, 1958. Address: A-309.

• INTERNIST: Age 33, Diplomate American Board of Internal Medicine, 1956. Fulltime teaching position since 1954. Experience with I-131 in thyroid disease and interested in clinical endocrinology and metabolism. Publications. Desire relocation in academic or quasi-academic situation. Will consider any challenging position. Available immediately. Address: A-310.

• SENIOR SURGEON & UROLOGIST: M.D., F.I.C.S., full-time teacher and research scientist at medical school, metropolitan area; numerous publications (2 books), desires a change on associate professor level; research, teaching, medical educational programs. Will consider U.S. and abroad. Address: A-311.

• ANATOMIST: Ph.D., male. At present assistant professor of anatomy. Teaching experience in both gross and microscopic anatomy. Publications. Desires position in medical or dental school. Can arrange to be available immediately. Address: A-312.

• INTERNIST: Certified, 35, family. Experienced director of medical education, teaching, administration, practice. Special training: arthritis, research psychiatry. Military Service completed. Desires challenging, responsible, full-time opportunity. Address: A-313.

• PATHOLOGIST: Age 33, university trained, board eligible. Desires position in a teaching hospital. Address: A-314.

• VIROLOGIST: Ph.D., 33. Six years research and teaching experience. Background in relationships of viruses to cancer cells, also in tissue culture and cytology. Prefers teaching position allowing adequate time for research. Available about June, 1958. Address: A-315.

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2530 Ridge Avenue Evanston, Illinois

• ANATOMIST: Ph.D., male, 42, married. Nine years teaching experience in gross human anatomy. Desires teaching position in gross anatomy. Research interests in comparative morphology and functional anatomy. Address: A-316.

• BIOCHEMIST-NUTRITIONIST: Clinical chemist, Ph.D. In charge of medical and surgical research laboratories for 12 years. Experienced with the use of radioisotopes, clinical drug testing, and metabolic methods involving both man and animals. Member of American Society of Biological Chemists and Certified in Clinical Chemistry. Numerous publications. Desirous of affiliating with an active group. Address: A-317.

• SECRETARY, ADMINISTRATIVE ASSISTANT: University graduate with social science, editing, training. Experience. Interested particularly openings in research setting, preferred location Washington, D. C. or Southwest. Address: A-318.

• PHYSICAL BIOCHEMIST: Ph.D. 1951. Original contribution: physical chemistry of proteins, thermodynamics and kinetics of biochemical reactions, chromatography, instrumentation, 2 years post-doctorate abroad. Career position—academic or research institute. Address: A-319.

• ANATOMIST: Dental degrees. Presently assistant professor in charge of microscopic anatomy and oral histology and embryology in New England medical and dental schools. Desires change of locale for full-time teaching and research. Available September 1958. Address: A-320.

• NEUROANATOMIST AND NEUROPHYSIOLOGIST: Mature male. Wide teaching experience and broad research interests. Numerous publications, and grants. At present associate professor with no opportunity for advancement. Would prefer teaching and research position in South. Address: A-321.

• ANATOMIST: M.D., male. Presently associate professor. Teaching experience in microscopic anatomy. Publications. Desires change of locale for reasons of health. Seeks academic or research position in medical center. Address: A-322.

• OBSTETRICIAN-GYNECOLOGIST: Age 32, married with family. M.B., Ch.B. (Otago University, New Zealand), member of Royal College of Obstetrician and Gynaecologists. Desires academic post in the United States in obstetrics and gynecology, interests being clinical, operative, teaching and writing, with a little research. Present position, Senior Registrar in Ob-Gyn (senior resident) at The London Hospital, London, England. Address: A-323.

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